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How to get the most out of rubber

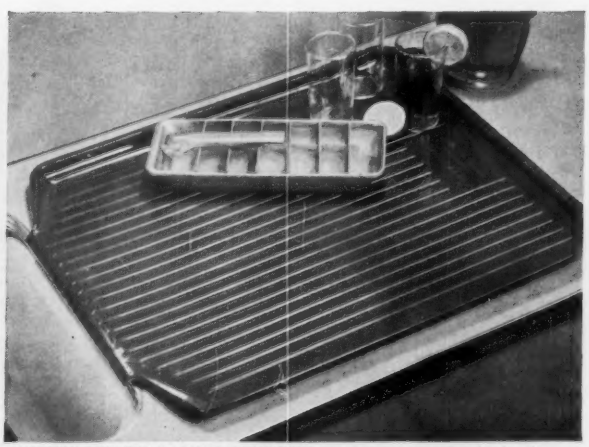
Each of the products pictured here has successfully met the test of today's competitive market. But there's no secret to this success. It stems from the simple fact that their manufacturers availed themselves of the new materials and services offered by the newly formed Rubber & Rubber Chemicals Department of the Goodyear Chemical Division.

The materials offered include two families of general-purpose styrene-butadiene polymers—PLIOFLEX Rubbers and PLIOLITE Rubber Latices. For oil-resistant applications, the CHEMIGUM Rubbers offer a range in both nitrile content and properties. For rubber reinforcement, there's PLIOLITE S-6B, a high-styrene resin. In non-staining antioxidants, WING-STAY S is the first of a line of job-designed rubber chemicals.

"Job-designed" aptly describes all of the materials supplied by the Rubber & Rubber Chemicals Department. As a matter of policy, they all were specifically developed to meet specific needs. And since proper application is essential to their advantageous use, it is also a matter of policy that their sale be accompanied by complete technical service.

Recognition of the need for thorough technical service was the basic reason for establishing the

COLORFUL COASTERS that stay bright and flexible are made of foamed PLIOLITE LATEX protected with WING-STAY S. They keep their "just bought" look and absorbency despite exposure to water, sunlight or repeated washings.



CHEERFUL HELPERS AROUND THE HOME are mats, strainers and other housewares of styrene rubber reinforced with PLIOLITE S-6B. The resin imparts toughness, rigidity and smoothness—adds to wear-, oil- and water-resistance.

ACID TEST IS TAKEN AND PASSED—every day in many ways—by strong, safe, easy-handled hose made of PLIOFLEX reinforced with fabric and, sometimes, steel wire. It's a flexible answer to many materials handling problems.

SOMETHING NEW UNDER THE CHRISTMAS TREE at many oil wells is an oil-resistant shoe sole consisting of CHEMIGUM blended with PLIOFLEX. This blend provides excellent combined wearing and oil-resistant properties at low cost.

in eight different ways

Rubber & Rubber Chemicals Department. Its formation permitted the marshaling of the skills and experience of many technicians, plus the proper physical facilities to help you get the most out of rubber as easily and economically as possible.

Why not learn firsthand how the products and services of the Rubber & Rubber Chemicals Department can put your product in the same class with the eight shown here? It's easily done by writing to: Goodyear, Chemical Division, Dept. Akron 16, Ohio.

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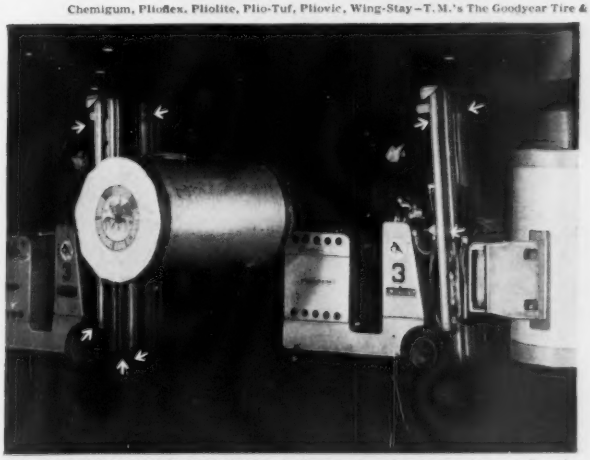

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Letters to the editor

Division Meetings

Dear Sir:

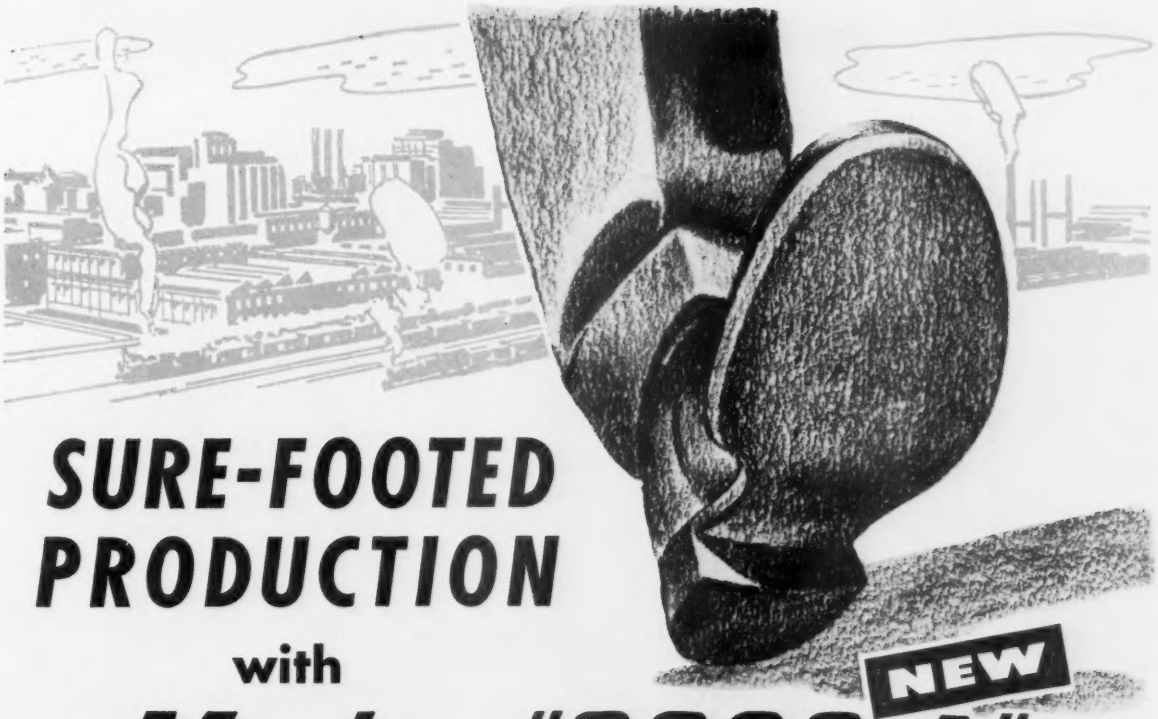
Many Rubber Division members are spending a large part of the first day of Division Meetings standing in line at hotel registration desks. This situation has existed, almost without exception, at every meeting held in the past several years. It is a situation that appears to be growing steadily more aggravated. The confusion about room registration has never been worse than it was at the recent Cleveland meeting.

In saying this, I intend no criticism of the local committees who have been in charge of housing. Members of these committees have the most thankless task of any of the meeting committees. Although they are at the mercy of the hotel managements, they must take considerable criticism from indignant members who find themselves without accommodations and never receive thanks when things occasionally do run smoothly.

The most aggravating feature of this situation is the "public be damned" attitude of the hotels. At Cleveland, room clerks confronted with confirmed reservations said "We haven't any rooms. What do you expect us to do about it?" The explanation offered by the assistant manager was that the hotel had miscalculated by 240 rooms. Such a situation is intolerable and the Rubber Division should take some action about it.

Would it be possible, at future meetings, to make arrangements so that members paying a $10 advance deposit could go to a special registration desk on arrival and be given a room immediately? This will prevent any loss to the hotel from unclaimed reservations. At the same time it will make it unnecessary for members to spend the first day of the meeting standing in a registration line instead of attending papers or taking care of their other business. Such an arrangement should also involve a financial penalty for the hotel if it fails to meet its commitments. Members who do not choose to pay an advance deposit will have to go on taking the same chance we all take at present that the hotel will not honor the ordinary so-called "confirmed" reservation.

While on the subject of division meetings, I would also like to voice my objection to the continually rising cost of the Divisional banquet. I have heard many other members express a similar opinion. It is my guess that the percentage of meeting registrants who attended the banquet at the Spring Meeting was lower than it has been at any recent meeting. If this was actually the case, the exorbitant price charged for the dinner can be blamed. Although the dinner was actually a good one of its kind it certainly was not worth



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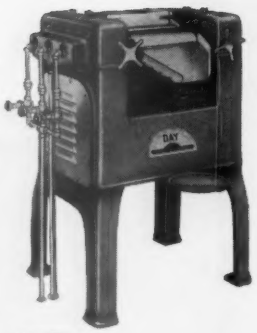

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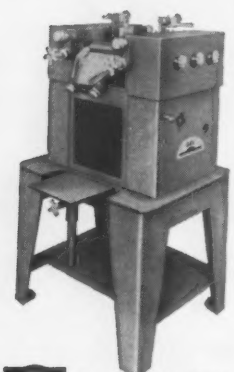

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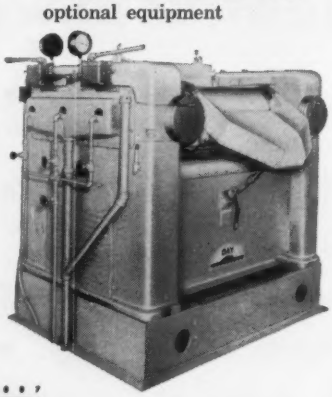

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$7.35. I would like to suggest that the next local arrangements committee faced with this sort of attempted extortion should, after obtaining the approval of the Division directors, cancel the banquet and make the reason clear to the hotel management. I believe that such an action, properly publicized, would have a very salutary effect on hotel managements in most of the cities where we regularly hold meetings.

RALPH F. WOLF
Columbia-Southern Chem. Corp.,
Barberton, Ohio.

Assistance Wanted

Dear Sir:

We are interested in a rubber or latex dipping solution for rubber coating cold rolled steel parts. We have many small pieces to rubber coat. We would like to have a product that will dry quickly and smoothly. Who can supply us with such a solution and give full details on the method of coating?

MORRIS I. GOLDBERG
International Mfg. Co.,
2512 Washington St.,
Roxbury 19, Mass.

Dear Sir:

We are contemplating the establishment of a factory to produce, in limited quantities, storage battery cases predominantly for 6 volt installations. We wish to produce a maximum of 100 cases a day. Do you know of any equipment manufacturers who could assist us in putting together the specifications for such a plant?

D. POLAK
Polak, Winters & Co.,
221 Pine St.,
San Francisco 4, Calif.

Dear Sir:

Our Swedish principals would like to find a neoprene solution ready for surface application, i.e., an already-mixed solution that could be painted or sprayed onto surfaces. They wish the solution to contain Neoprene AC or a similar type. Can you help up find a manufacturer of this type of solution?

M. ADEN
Aden Trading Co.,
Croton-on-Hudson, N. Y.

Dear Sir:

We would greatly appreciate it if we could be directed to a manufacturer who can vulcanize rubber and glass tape. We would like someone who can manufacture this item in long lengths.

FRANK JAROS
Allied Compositions Co.,
11-15 44th Road,
Long Island City, N. Y.

Memo from the Editor

The "Letters to the Editor" columns are open to all of our readers and we invite comments for publication. These comments may concern any facet of the rubber industry. We reserve the right to edit all material. Address: Editor, RUBBER AGE, 101 West 31st St., New York 1, N. Y.

Photo courtesy Monkey Grip Sales Company, Dallas, Texas

A Mat-erial Improvement!

Rubber automotive floor mats as pictured above are now better than ever. The reason? They have been materially improved by the incorporation of PLIOLITE S-6B in the base stock.

PLIOLITE S-6B is a high styrene-butadiene copolymer, designed and made to reinforce rubber. Its use in these mats not only imparts a leatherlike feel and appearance without overloading, but also increases tensile strength and resistance to abrasion and staining.

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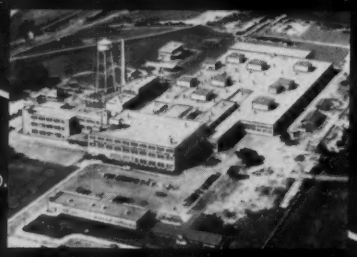

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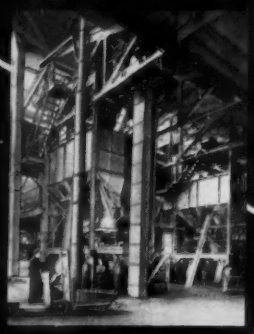

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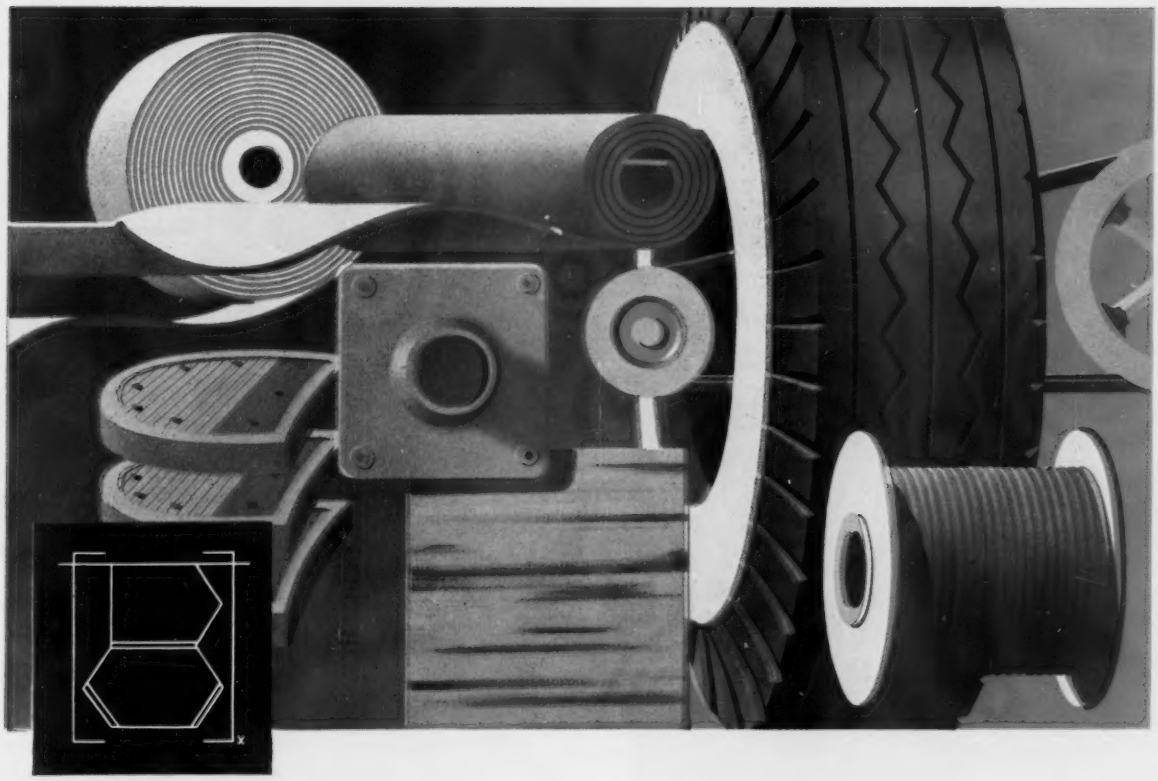

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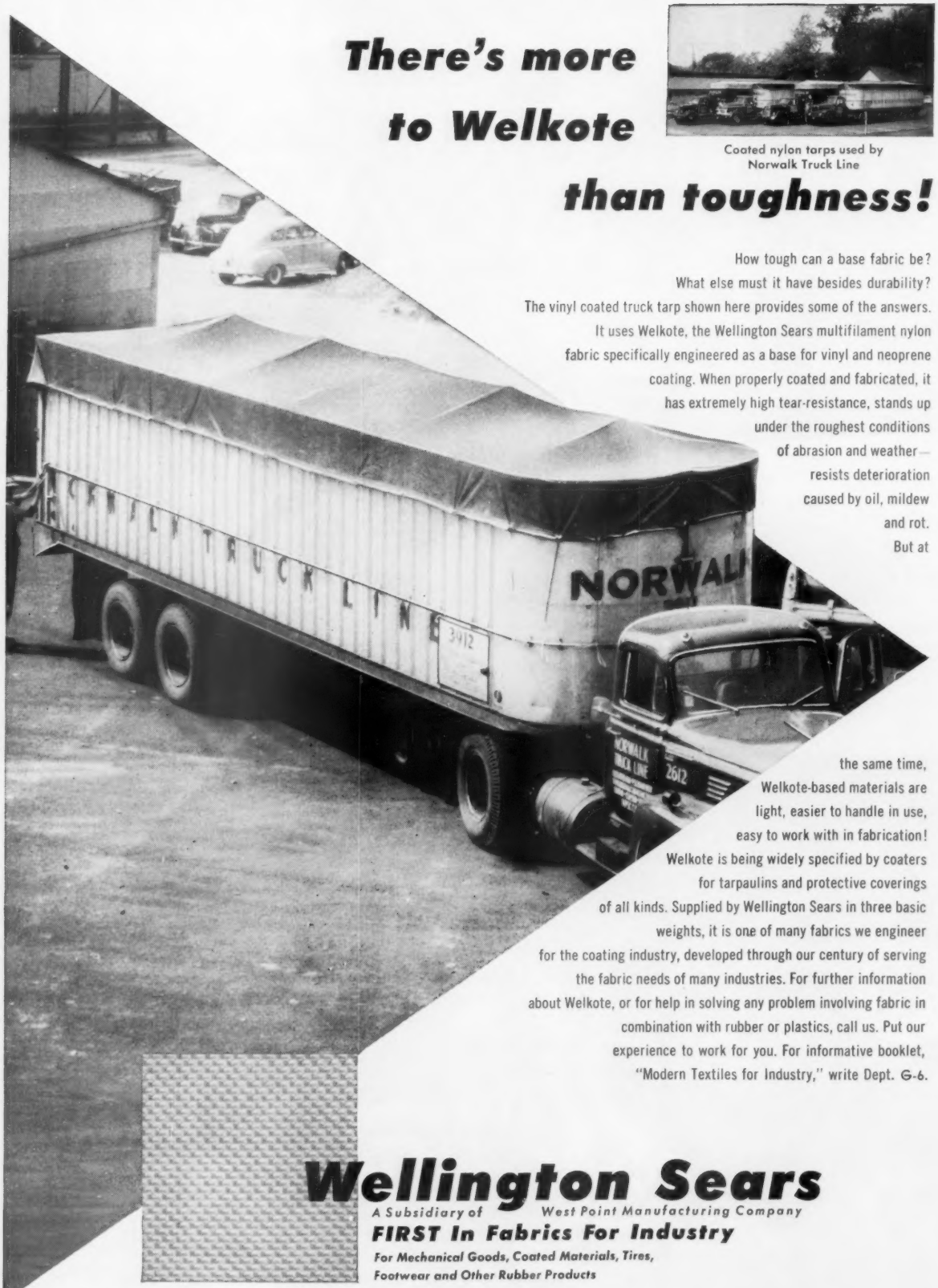
AMERICAN-Standard PRODUCTS
Standard's Standard
Shenango CHINA
RESCO
GENERAL PORCELAIN MFG. CO.
SYNKOLOID
B.F.Goodrich
CERAMIC PRODUCTS, INC.
THOMAS INSULATORS RELIABILITY
Colonial PORCELAIN
PEMCO
FLINTKOTE Canec
Stetson CREATION hand painted underglaze
TILE OLEAN COMPANY
Stylon CERAMIC TILE
ER
FSTC
JACKSON CHINA FALLS CREEK, PA.
WILLETTE

There's more to Welkote than toughness!

Coated nylon tarps used by Norwalk Truck Line

How tough can a base fabric be? What else must it have besides durability? The vinyl coated truck tarp shown here provides some of the answers. It uses Welkote, the Wellington Sears multifilament nylon fabric specifically engineered as a base for vinyl and neoprene coating. When properly coated and fabricated, it has extremely high tear-resistance, stands up under the roughest conditions of abrasion and weather—resists deterioration caused by oil, mildew and rot. But at the same time, Welkote-based materials are light, easier to handle in use, easy to work with in fabrication! Welkote is being widely specified by coaters for tarpaulins and protective coverings of all kinds. Supplied by Wellington Sears in three basic weights, it is one of many fabrics we engineer for the coating industry, developed through our century of serving the fabric needs of many industries. For further information about Welkote, or for help in solving any problem involving fabric in combination with rubber or plastics, call us. Put our experience to work for you. For informative booklet, "Modern Textiles for Industry," write Dept. G-6.



Wellington Sears

A Subsidiary of West Point Manufacturing Company

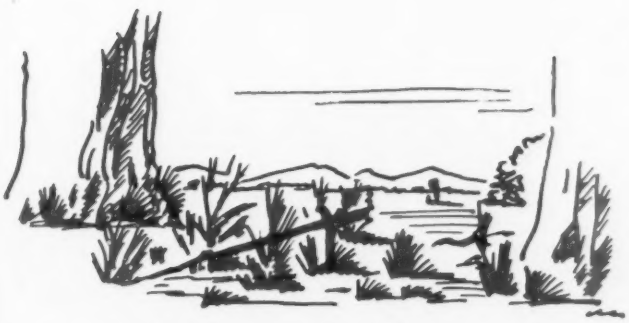
FIRST In Fabrics For Industry

For Mechanical Goods, Coated Materials, Tires, Footwear and Other Rubber Products

Wellington Sears Co., 65 Worth St., New York 13, N. Y. • Atlanta • Boston • Chicago • Dallas • Detroit • Los Angeles • Philadelphia • San Francisco • St. Louis

I HAVE GONE THIS WAY

I HAVE NOT GONE FAR



I HAVE GONE FAR

I HAVE GONE SIX DAYS JOURNEY

THE FIRST MARKERS

It was three centuries before the white man finally completed an overland journey to the west coast of America. So vast was the continent, so great its forests and prairie expanses that travel was confined, in the main, to waterways, and in any event, to those areas near at hand.

The Indian had his methods of marking a trail. In his travels he sometimes bent saplings and, tying them down, indicated direction. The Indians of the plains often used the skulls of the buffalo to point toward their destination and with other markings left information they wanted others to know.

The Abnaki Indians used the ingenious method shown by the sticks and twigs in the illustration, thereby leaving a quickly deciphered sign as to their whereabouts. The white man adopted many of the Indian sign methods as he traversed the tremendous length and breadth of the land. He broke twigs, as did the Indian, and he left his "blaze" along the way. Of necessity he traveled light, even his oxcart and horse-drawn wagon bearing but the most essential things for livelihood.

Man has progressed far, particularly on this continent, in his ability to transport himself and his products. The once vast, unmarked land, so slow and tedious to traverse, has been "blazed" in every direction with highways and roadways; and on them, with a speed and convenience never dreamed of, the rubber tire — reinforced with carbon black — transports the commerce of the day.

The modern tire's endurance, longevity and dependability testify to the ingenuity of its manufacturers and to the unfailing qualities that carbon black provides.

UNITED CARBON COMPANY, INC.

KOSMOS 50

Kosmos 50 is a fast extrusion (FEF) structure black with excellent combination of well balanced properties. It is **the** black for better processing.

Kosmos 50 is the ideal choice for better, smoother and more uniform control on size and dimensional stability of extrusions. It enhances appearance.

Kosmos 50 is a must for black extruded mechanicals. Its use in molded goods is extensive. It is preferred for sub-treads and carcass stocks, and in some grades of tread rubber (camelback).

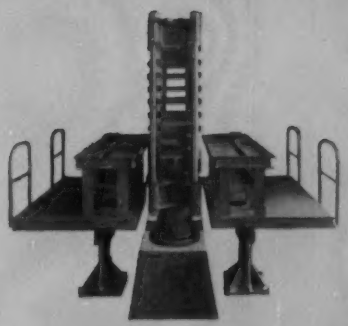
Standardize on UNITED blacks for established quality and uniformity. They succeed where other blacks fail. Compounders know.

UNITED CARBON COMPANY, INC.

A subsidiary of United Carbon Company

CHARLESTON 27, WEST VIRGINIA

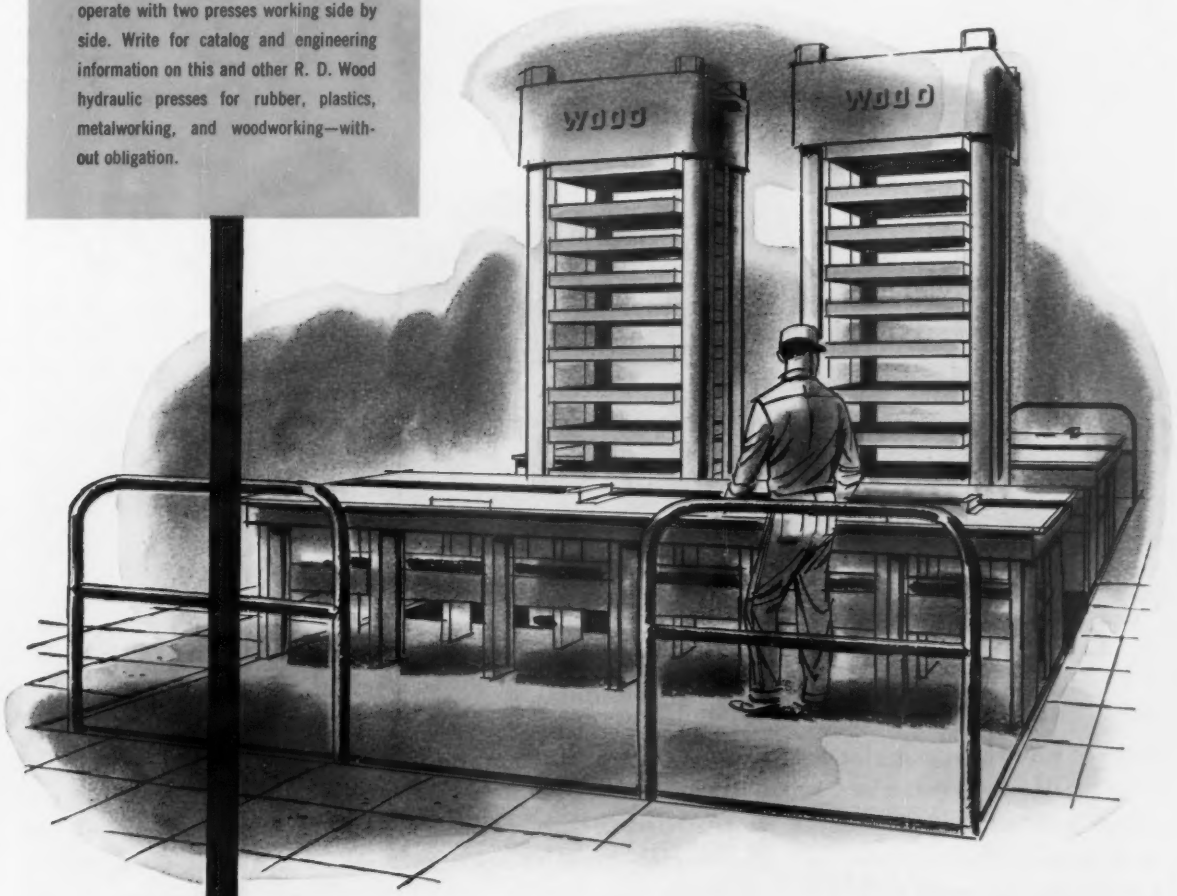
NEW YORK AKRON CHICAGO BOSTON MEMPHIS



192-ton Multiple Opening Platen Press. Designed for molding rubber products. This press may be operated from an individual self-contained pumping unit or a central accumulator system. Two elevators operate with two presses working side by side. Write for catalog and engineering information on this and other R. D. Wood hydraulic presses for rubber, plastics, metalworking, and woodworking—without obligation.

The nameplate is your guarantee of value

When you buy an R. D. Wood press, you can take *full value* for granted. In more than 150 years, the R. D. Wood nameplate has never appeared on a product of inferior quality. It is your guarantee of sound design, premium materials, superlative craftsmanship. It is your assurance also of smooth, trouble-free performance, high productivity, long life and production economies.



R. D. WOOD COMPANY

PUBLIC LEDGER BUILDING • PHILADELPHIA 5, PENNSYLVANIA

Representatives in Principal Cities

MAKERS OF HYDRAULIC PRESSES AND VALVES • FIRE HYDRANTS • CAST-IRON PIPE • GATE VALVES • GAS PRODUCERS • ACCUMULATORS

Lipstick and candy and rubber sole shoes

(From the song hit of the same name)*

Rubber sole shoes popular in song today—are popular everywhere with adults and youngsters alike . . . because they're comfortable and wear so well.

To insure that rubber soles stay flat, retain their dimensional stability, many manufacturers use Solka-Floc—a finely divided, highly purified cellulose. Used in other products such as floor tile, for example, Solka-Floc reduces blistering and nerve, improves dispersion, controls shrinkage, permits sharper designs and harder, smoother surfaces . . . with notable economy.

If you have a problem in the processing of your products—perhaps Solka-Floc can help you too. Write Dept. GF-6, Brown Company, 150 Causeway Street, Boston 14, Mass.

**By Bob Haymes as recorded by Julius LaRosa for Victor. Copyright Jimskip Music, Inc., 1956.*

SOLKA-FLOC®

Freckle Problems?

eliminate them with

KO-BLEND*

"Freckles" caused by sulfur bloom on light-colored stock are the plague of every production department. The addition of KO-BLEND® to your rubber formulations eliminates that problem. With today's tremendous demand for white and pastel stock in whitewalls, housewares, toys, shoe soles and a multitude of new applications, the need is greater than ever for proven sulfur bloom control.

KO-BLEND stops costly sulfur bloom in uncured stock, and pays for itself many times over by reducing rejects, thus speeding production. If you're turning out any light-colored stock, you need KO-BLEND. Write today for samples, literature and technical assistance.

THE GENERAL TIRE & RUBBER COMPANY
Chemical Division, Akron, Ohio

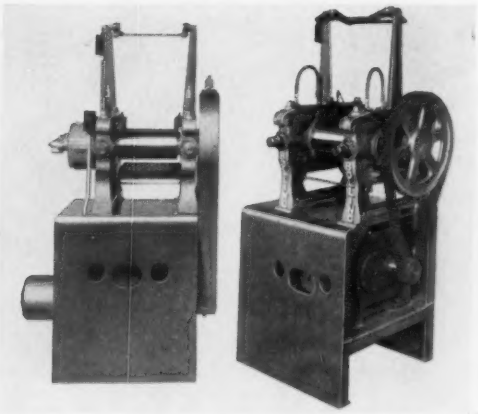
*KO-BLEND is a latex-compounded masterbatch of 50% 85% insoluble sulfur and 50% GRS-type rubber.

Chemical Division GENERAL
THE GENERAL TIRE & RUBBER CO.

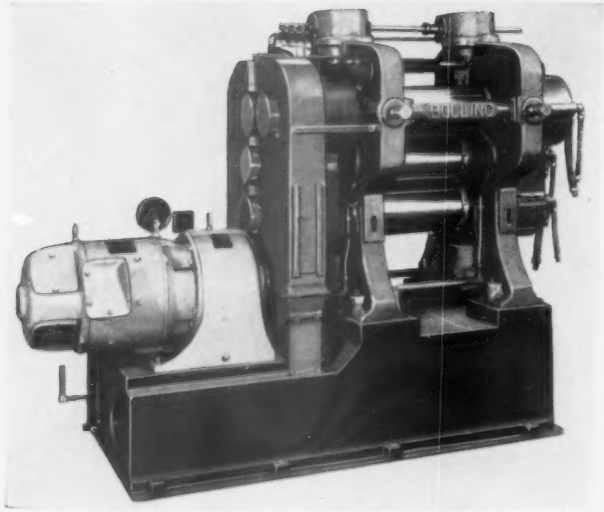
Specialists in LABORATORY EQUIPMENT

for the Rubber or Plastics Manufacturer

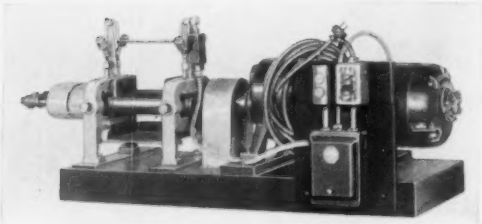
The first practical combination intensive mixer for experimentation



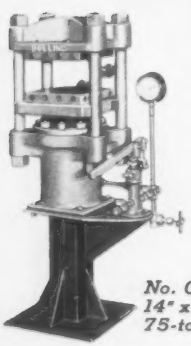
No. 0—6" x 12" mill, standard model



No. 1—8" x 16" 4-roll (or 3-roll) calender

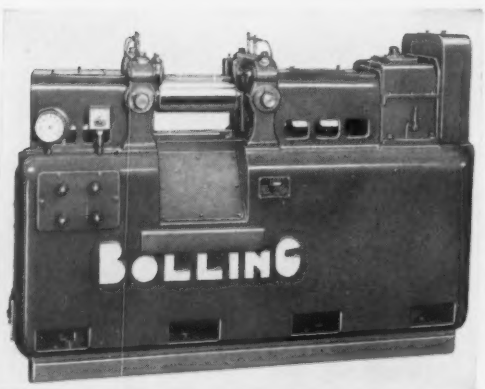


No. 00—2½" x 7" midget mill



No. 0—14" x 14" 75-ton press

● Stewart Bolling laboratory equipment is designed for maximum versatility in experimentation, research, and testing. Special consideration has been given to requirements for top performance. In the case of mills, results are in direct ratio to sharpness of temperature control and correct roll speeds. In some models, too, there is friction selection over a wide range. Illustrated here are just a few representative types of machines available. Get information on the equipment that gives you the particular features you must have.



No. 0X—6" x 13" mill (Ultra model)

STEWART BOLLING & COMPANY, INC.

3196 EAST 65TH STREET • CLEVELAND 27, OHIO

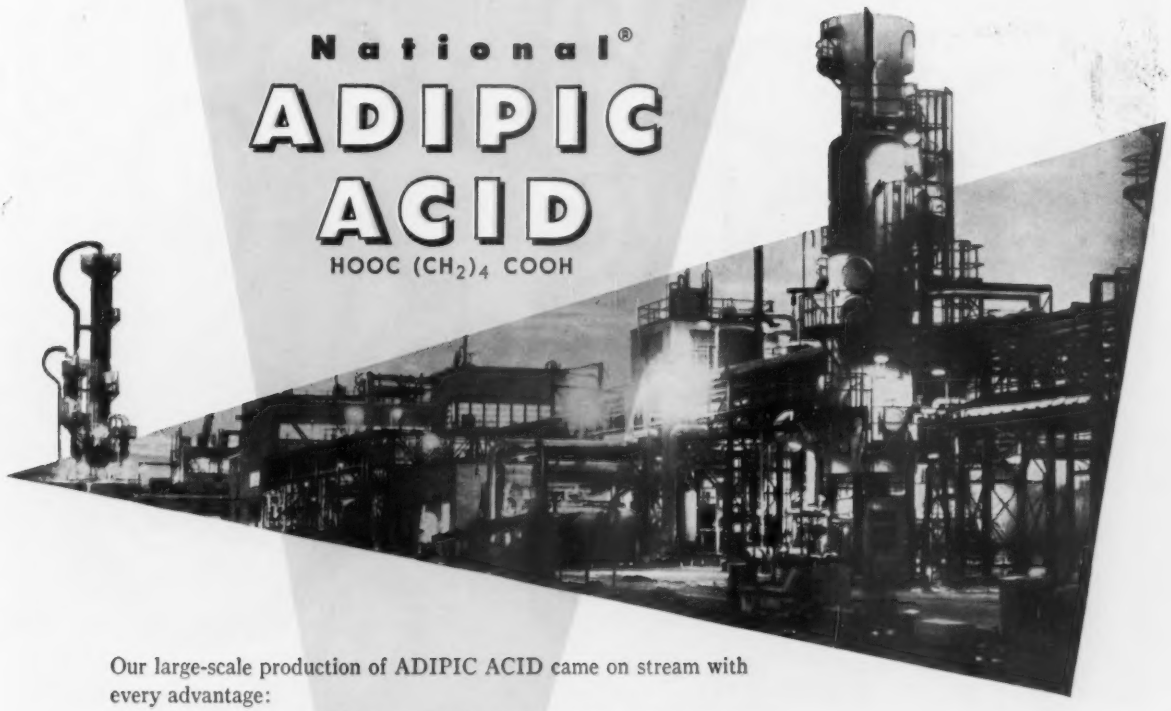
• INTENSIVE MIXERS AND MILLS • CALENDERS • REFINERS • CRACKERS HYDRAULIC PRESSES • PUMP UNITS BALE SLITTERS • SPEED REDUCERS

Sets a new high standard of quality

National®

ADIPIC ACID

$HOOC(CH_2)_4COOH$



Our large-scale production of ADIPIC ACID came on stream with every advantage:

A brand new plant Allied Chemical-integrated right back to basic raw materials.

An efficient, continuous process yielding an outstandingly high quality product—99.7% minimum purity, light color and low iron.

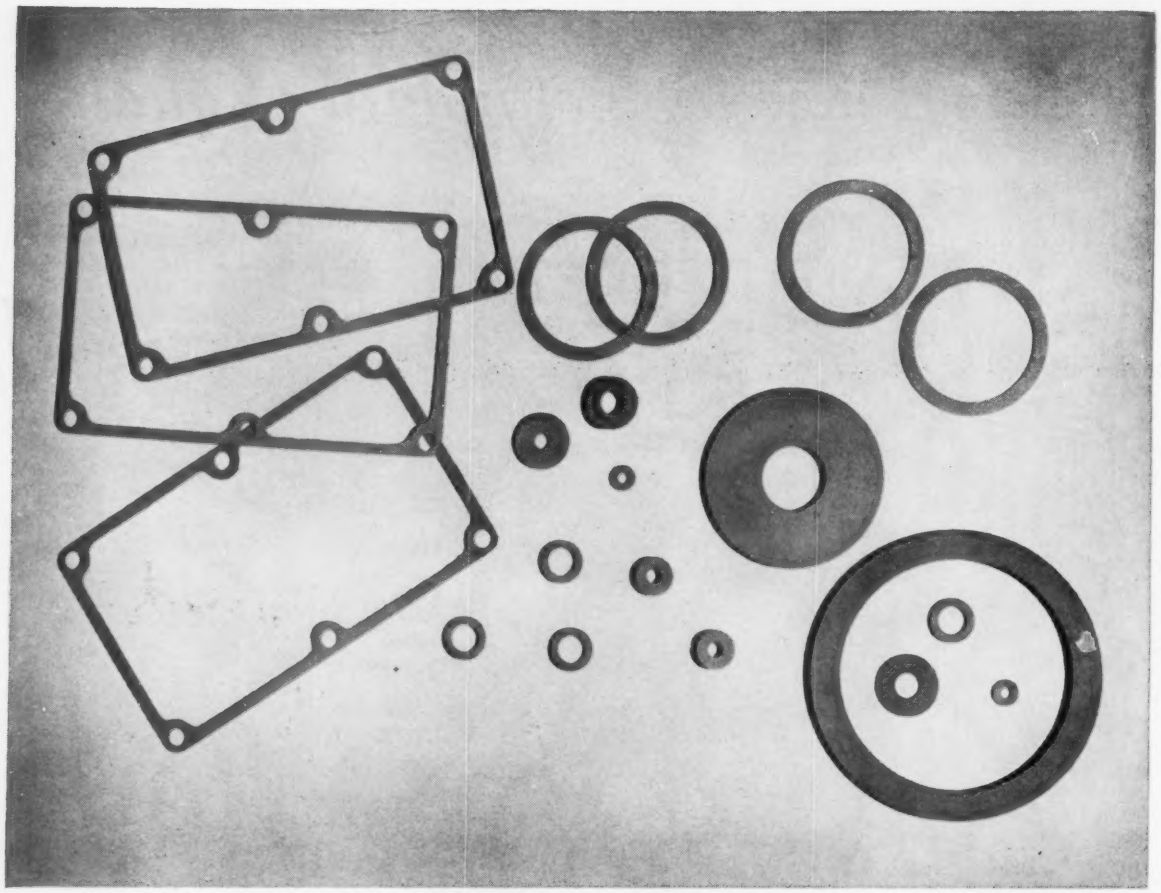
If you make or contemplate making adipates, adipic polyesters or polyurethans, you should investigate the advantages of National ADIPIC ACID. It can be used with complete satisfaction in the rubber, plastics, plasticizer, lube oil and chemical industries. We will be glad to send samples, technical data and quotations.

SEND FOR TECHNICAL BULLETIN I-12

This comprehensive 8-page technical bulletin on National Adipic Acid gives physical and chemical properties; principal reactions of the carboxyl and alpha methylene groups; solubility curve, and suggested uses with copious literature references.

NATIONAL ANILINE DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 RECTOR STREET, NEW YORK 6, N. Y.

Boston Providence Charlotte Chicago San Francisco Atlanta Portland, Ore. Greensboro Philadelphia Richmond Cleveland Los Angeles Columbus, Ga. New Orleans Chattanooga Toronto



SEALS OR GASKETS—Products that must display outstanding resistance to compression set, perform better when Hercules Di-Cup—the new "cure-all" for polymers—is used as the curing agent.

DI-CUP* FOR TOP RESISTANCE TO COMPRESSION SET

Wherever low compression set, good aging, and good low-temperature properties are required, versatile new Hercules Di-cup (dicumyl peroxide) is the ideal curing agent.

Seals and gaskets, however, are only one of the many categories of products for which this nonsulfur vulcanizing agent has an indicated usefulness.

By producing carbon-to-carbon cross linking, Di-cup can be used to advantage as a curing agent in natural rubber, GR-S, Buna N, silicones, polyethylene and many other polymers.

Economical to use, Di-cup is a stable peroxide of low volatility. In addition to producing vulcanizates having low compression set, good aging, and resistance to solvents and oils, Di-cup enables you to produce whiter white stocks which have good color retention. Silicones in thick cross section cured with Di-cup are free of gas bubbles and acidic by-products.

To learn more about this nonsulfur curing agent, write to Hercules. We'll be glad to send you technical data and information on currently available commercial forms.

** Hercules trademark*

Oxychemicals Division, Naval Stores Department

HERCULES POWDER COMPANY

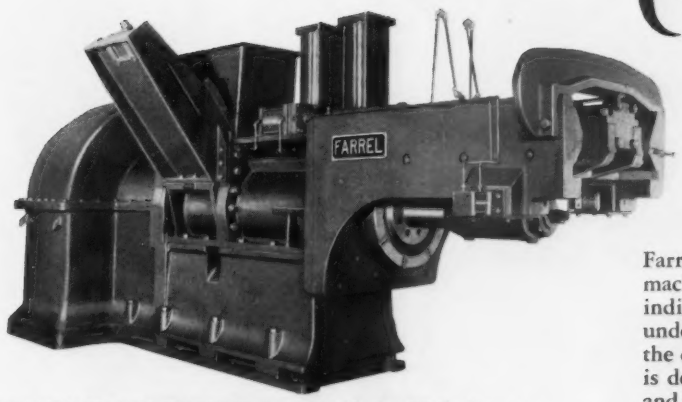
INCORPORATED

918 Market St., Wilmington 99, Del.

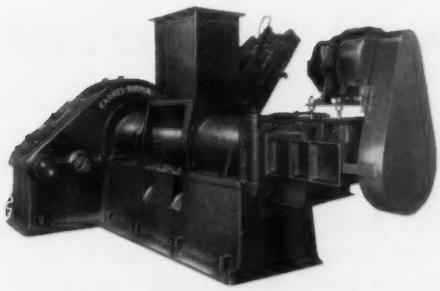
N056-2

PRODUCTION EFFICIENCY FORMULA:

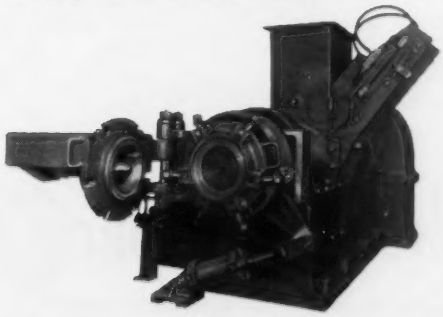
BANBURY® MIXER + MATCHED { EXTRUDER, PELLETIZER, STRAINER-EXTRUDER



15" HEAVY-DUTY EXTRUDER for use with size 11 Banbury on short-cycle operation. Can also be used with two size 11's for longer cycles. Stock is delivered in a 48" wide continuous sheet.



12" PELLETIZER designed to transform bulky lumps of rubber into small, free-flowing pellets. End-discharge head is hinged to permit thorough cleaning when changing from one stock to another.



12" STRAINER-EXTRUDER has small diameter straining head plate without supporting spider, and hydraulically operated breech-lock closure. The extruding head has an externally supported, adjustable cone die. The combined head can be quickly opened and easily cleaned.

Farrel-Birmingham® screw-type extruding machines are heavy-duty units, built to suit individual needs. Generally, they are located under the Banbury mixer for gravity feed of the discharge. The selection of extruder size is dependent upon the size of the Banbury and the duration of the mixing cycle.

These extruders provide continuity of production. Operation is continuous, and the machine generally requires no operator.

The various features of the extruders are dictated by the use intended for them, and the particular requirements of the application. Screw diameters range up to 24".

Whatever your needs may be for heavy-duty extruding machines, Farrel-Birmingham has the experience and engineering ability to produce units that will provide a satisfactory answer to your problems. Write for information about extruders for specific applications or ask for a copy of Bulletin 195.

FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONNECTICUT

Plants: Ansonia and Derby, Conn., Buffalo and Rochester, N. Y.
Sales Offices: Ansonia, Buffalo, New York, Akron Chicago, Fayetteville (N.C.), Los Angeles, Houston

F-B® PRODUCTION UNITS

Banbury Mixers • Plasticators • Pelletizers • Extruders • Calenders • Mixing, Grinding, Warming and Sheeting Mills • Refiners • Crackers • Washers • Hose Machines • Bale Cutters • Hydraulic Presses and Other Equipment for Processing Rubber and Plastic Materials

Farrel-Birmingham®

FB-1028

BEFORE BRUSHING

AFTER BRUSHING

FAST
flash removal

REMOVING mold flash from tires is just one example of how Osborn Power Brushing is helping speed up and improve production.

Similarly, power brushing has proven the fastest and most efficient method for removing excess rubber from a virtually endless variety of molded mechanical rubber goods.

An **O**sborn **B**rushing **A**nalysis, made in your plant and at no obligation to you, will show not only *where* power brushing can be used to advantage but *how* you can use it most effectively. Write *The Osborn Manufacturing Company, Dept. J-5, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

Osborn Brushes

OSBORN

BRUSHING METHODS • POWER, PAINT AND MAINTENANCE BRUSHES
BRUSHING MACHINES • FOUNDRY MOLDING MACHINES

to help you select

SHELL DUTREX

PLASTICIZERS and EXTENDERS

For GR-S and Natural Rubber

General purpose applications

Dutrex 6
Dutrex 7
Dutrex 6H (SPX-97)
Dutrex 20
Dutrex 15E
Dutrex 15W

Non-staining or light colored stocks

Dutrex 39
Dutrex 32

For Butyl Rubber

Dutrex 31
Dutrex 32

For Nitrile Rubber

Dutrex 21
Dutrex 25

For Neoprene W types

Dutrex 6
Dutrex 20

SHELL OIL COMPANY

50 West 50th Street, New York 20, New York
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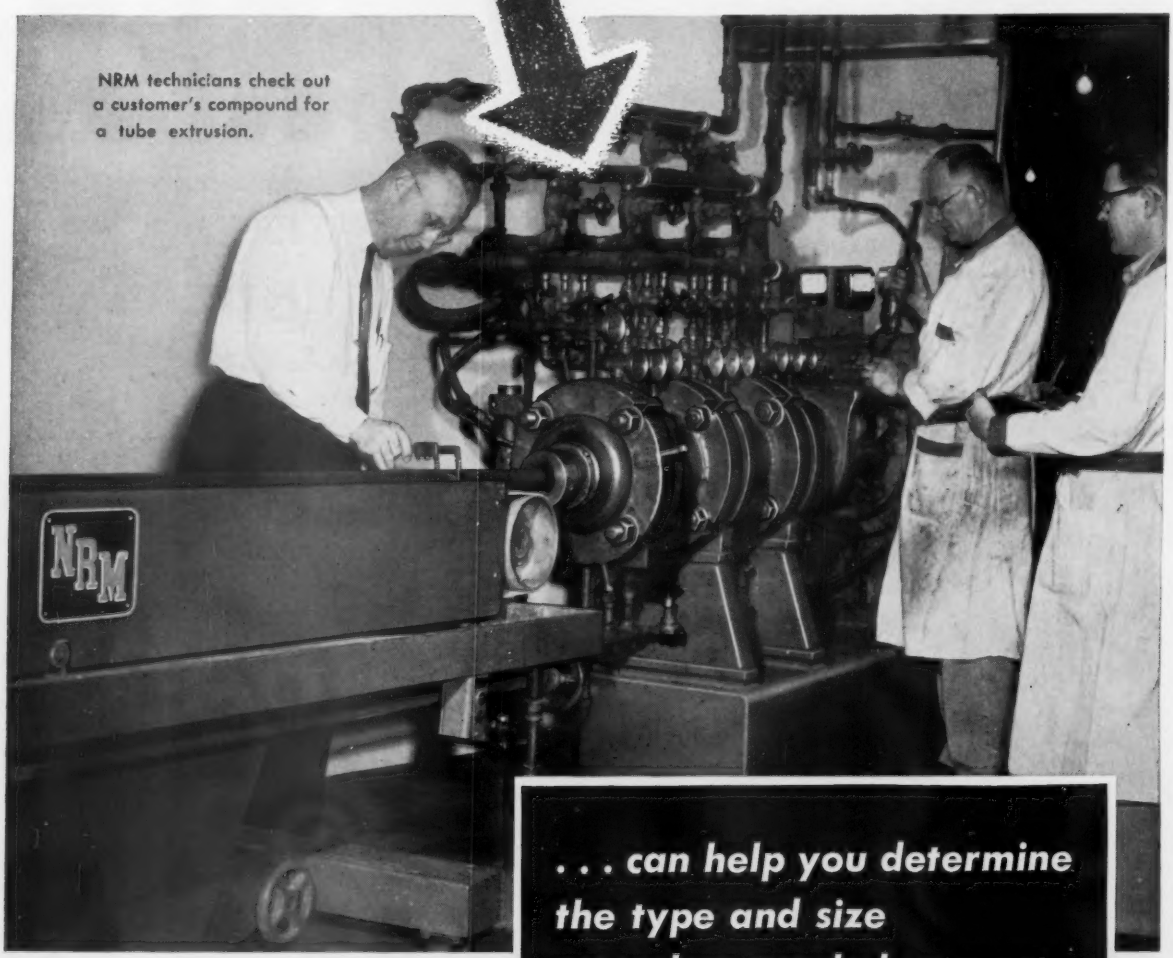
SHELL

This special NRM RUBBER EXTRUDER

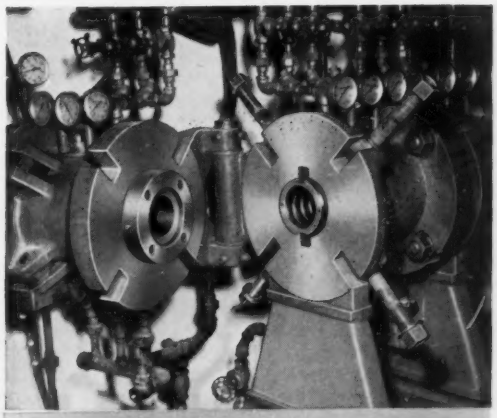


NRM technicians check out a customer's compound for a tube extrusion.

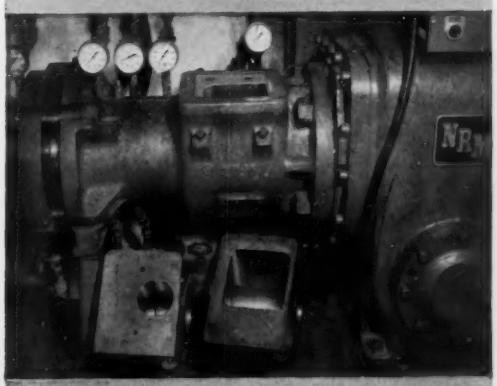
. . . can help you determine the type and size extruders needed to meet your rubber production requirements **EXACTLY** . . .

2504

It is a part of MANY laboratory facilities we maintain to assure our customers more efficient, more profitable rubber production with . . .



Compounds are tested under several extruder variations to determine the best production condition. Two hinged cylinder sections attached to the base section of the laboratory extruder provide for one, two or three times the cylinder length of a standard rubber extruder. Here, combination smooth-bore and Mil-X-Truder® Liners are being used.



Best method of feeding compounds are also determined. The interchangeable feed boxes shown here are: side feed undercut, for strip feeding (installed), round center feed for powder or pellets (lower left), and at lower right, oblong center feed for crumb or chunk.

NRM EXTRUDERS

What type and size extruder should you buy to produce your rubber compounds most economically? What screw length and type is most suited to your extrusion requirements? Should the machine be equipped with smooth-bore, or fluted cylinder liners?

If you are planning to purchase rubber extruders, you'll want answers to these and other questions, and you'll want them *before* you buy.

You can get these answers at NRM.

We maintain extensive laboratory facilities which have two main functions: one, to help *us* make sure the extruders we build are of most practical design, and two, to help *you* make sure the NRM Extruders you buy are properly selected (and properly equipped) for the range of work they are to do. Even after the right extruder has been determined, NRM field engineers "follow up" on its installation to make sure the customer gets *all* the performance inherent in the machine. We make these laboratory facilities and this field service available to the rubber industry, and invite you to take advantage of them to help solve your particular extrusion problems.

The specially designed rubber extruder shown on the opposite page is an important part of these laboratory facilities. With it we can test not only the extrudability of your standard or special compounds, but determine exactly the type of machine required to extrude them. It is equipped for devolatilizing wet compounds, and extruding compounds by oil injection. It can be water cooled, or heated by steam or oil. It can be converted quickly from a short to a long machine, with either machine having smooth-bore cylinder, Mil-X-Truder® Liners, or combination of both. It can use any of several NRM feed screws, and feed boxes may be interchanged to permit a variety of feeding methods. In effect, the machine provides *all* extruder variations necessary for testing any rubber compound under various production conditions.

This extruder—and our entire laboratory facilities—are available to help develop and test your rubber compounds, and determine *exactly* the NRM Extrusion Equipment needed to produce them economically. We invite you to take advantage of these facilities. Call us about it today.

NATIONAL RUBBER MACHINERY COMPANY

NRM

Creative Engineering

General Offices and Engineering Laboratories: 47 West Exchange St., Akron 8, Ohio
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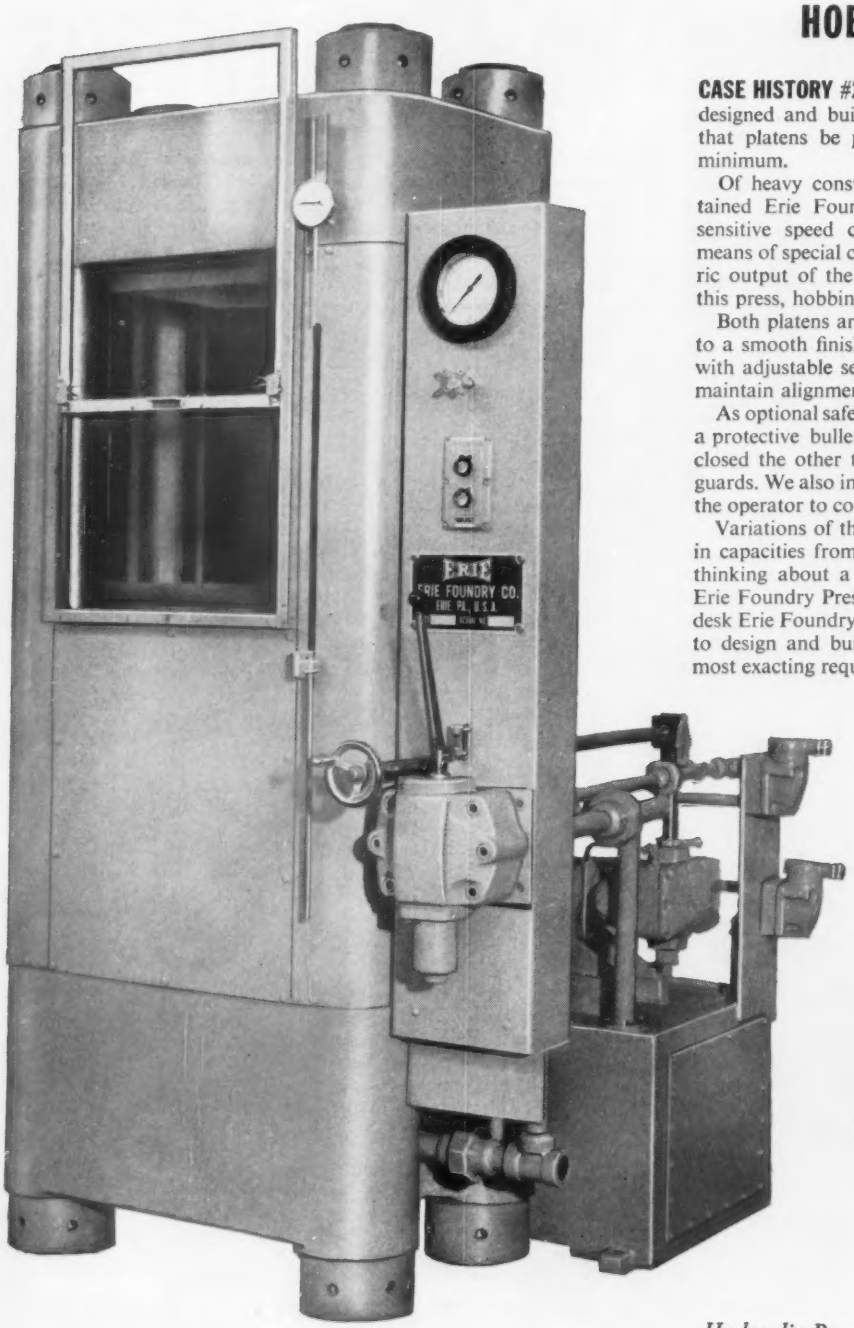
WEST: Western Sales: S. M. Kipp, Box 441, Pasadena 18, Cal.
MID-WEST: W. G. Potts, 5875 N. Lincoln Ave., Chicago 5, Ill.
EXPORT: Gillespie & Company, 96 Wall St., New York 6, N. Y.

2504

ERIE PRESS OF THE MONTH



HOBBING PRESS

CASE HISTORY #2—This 500 ton Hobbing Press was designed and built for a customer who demanded that platens be parallel and deflection kept to a minimum.

Of heavy construction throughout, the self-contained Erie Foundry Hobbing Press achieves the sensitive speed control essential for hobbing by means of special controls which change the volumetric output of the pump under load (pressure). On this press, hobbing is a smooth, sensitive operation.

Both platens are accurately machined and ground to a smooth finish and the ram platen is equipped with adjustable semi-steel guides on each corner to maintain alignment.

As optional safety equipment, Erie Foundry added a protective bullet-proof glass sliding door and enclosed the other three sides of the press with steel guards. We also installed a depth gauge which allows the operator to control each hob accurately.

Variations of this hobbing press can be furnished in capacities from 200 ton to 3000 ton. If you are thinking about a new hydraulic press, call in the Erie Foundry Press Engineer. He will bring to your desk Erie Foundry Company's experience and ability to design and build a press which will meet your most exacting requirements.

ERIE

SINCE 1895

Hydraulic Press Division

ERIE FOUNDRY CO. ERIE, PA.

underfoot...and has been ever since its early days of production!

One of the first jobs done by Silene EF was its successful use in non-marking soles and heels, which today still keeps Silene EF the number one reinforcing pigment in soling.

The versatility of Silene EF has adapted it to the times. As new styles and products (such as cellular sponge) have come along in recent years, Silene EF remains in the new formulations as an outstanding value among the pigments available to soling compounders.

Outsoles, innersoles, slab, heels, toplifts, whatever the application, whatever the polymer . . . Silene EF does a superb job. If you are not already using Silene EF in your compounds, it will be worth your while to investigate this reinforcing pigment right away.

Contact Department Silene, Columbia-Southern Chemical Corporation, One Gateway Center, Pittsburgh 22, Pa., for complete information and working samples.

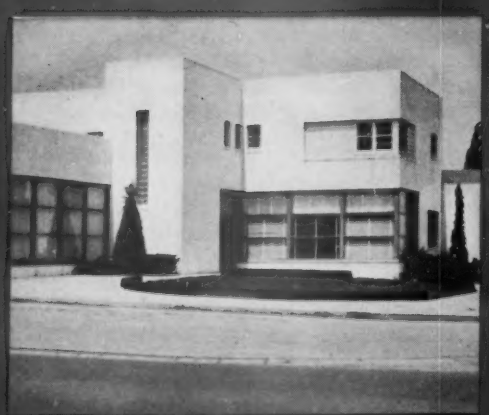
SILENE EF, an exclusive Columbia-Southern pigment, is a white, precipitated calcium silicate of very fine particle size. It is shipped in the form of friable agglomorates which normally break down under usual mixing procedures. Standard packaging is 50 pound multiwall paper bags.

COLUMBIA-SOUTHERN CHEMICAL CORPORATION
SUBSIDIARY OF PITTSBURGH PLATE GLASS COMPANY
ONE GATEWAY CENTER · PITTSBURGH 22 · PENNSYLVANIA

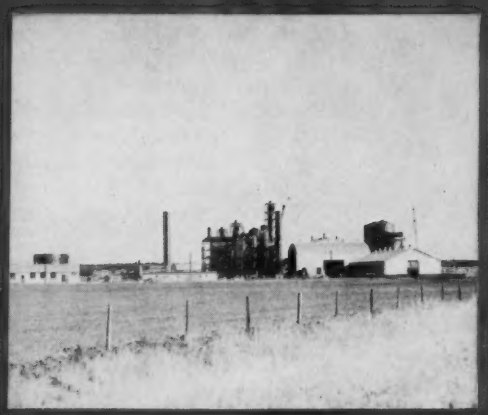
DISTRICT OFFICES: Cincinnati · Charlotte · Chicago Cleveland · Boston · New York · St. Louis · Minneapolis New Orleans · Dallas · Houston · Pittsburgh · Philadelphia San Francisco

IN CANADA: Standard Chemical Limited and its Commercial Chemicals Division

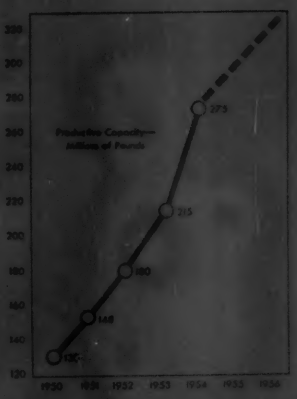
DYNAMIC GROWTH
in Carbon Blacks . . .
by
WITCO-CONTINENTAL



Active Center of Carbon Black Research is the WITCO-CONTINENTAL Laboratory at 1400 W. 10th Avenue, Amarillo, Texas.



Modern Production Facilities, such as this new plant at Ponca City, Oklahoma, **enable WITCO-CONTINENTAL to produce a complete line of carbon blacks. Latest process controls assure rigorous uniformity of grades in all 5 WITCO-CONTINENTAL plants.**



Production, research and technical service have shared in the dynamic, yet balanced, growth of WITCO-CONTINENTAL as a producer of carbon blacks.

As our production grows, we are continually expanding our services to provide rubber manufacturers with every benefit of modern carbon black technology.

Call on WITCO-CONTINENTAL for prompt sales and technical service in carbon blacks.

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CARBON BLACKS

FURNACE BLACKS

Continex® SRF — Semi-Reinforcing
Continex SRF-NS — Non-Staining
Continex HMF — High Modulus
Continex HAF — High Abrasion
Continex FEF — Fast Extruding
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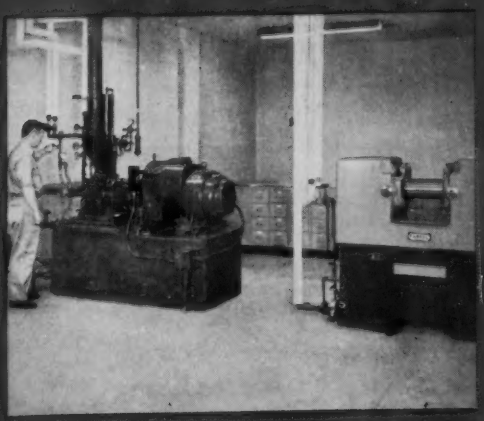
Continex CF — Conductive Furnace

CHANNEL BLACKS

Continental® AA — (EPC) — Witco No. 12
Continental A — (MPC) — Witco No. 1
Continental F — (HPC) — Witco No. 6
Continental R-40 — (CC) — Conducting



New Technical Service Laboratory at 213 West Bowery Street, Akron, is completely equipped to handle customers' formulation problems.

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on any TIRE COMPOUND

(automotive or wheel goods)

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The key to these time and money savings is our patented "RECLAIMATOR PROCESS" which produces quality reclaims in minutes where other conventional processes require hours.
These new reclaims are offering all tire manufacturers GREATER VALUE in THREE WAYS.

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2. EASIER and FASTER processing SAVES YOU MONEY on manufacturing costs.
3. Material costs are substantially LOWER with "RECLAIMATOR PROCESS" Reclaims because they will take higher loadings to achieve the SAME RESULTS!

The following list highlights the characteristics of several of our reclaims.

1. FLO-MIX-X: Insures high tensile and abrasion resistance at *reasonable cost*. Also minimizes ozone attack (sidewall cracking).
2. R-400: Non-staining, fast processing for white sidewall tires. "The Reclaim that's Right for Black or White."
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4. R-650: For EXTREMELY HIGH percentage of NATURAL RUBBER you can't match this one anywhere. In addition, its low Mooney plasticity gives you easier processing and *faster* mixing.

SAMPLES WILL BE SENT ON REQUEST

Always keep reclaims in your formula and always look to US for the BEST. U. S. Rubber Reclaiming Company, Inc., P.O. Box 365, Buffalo 5, N. Y. Trenton Agent: H. M. Royal, Inc., 689 Pennington Avenue, Trenton, N. J.

73 Years Serving the Industry Solely as Reclaimers

U.S. RUBBER RECLAIMING COMPANY, INC.
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The delayed action of Sharples ETHYLAC cures assures better mold flow, with complete and accurate molding. This results in a sharp decrease in "seconds".

When ETHYLAC is used in fast-curing molded goods, fewer rejects are encountered and quality of the finished product is materially improved.

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BOSTON, MASS.

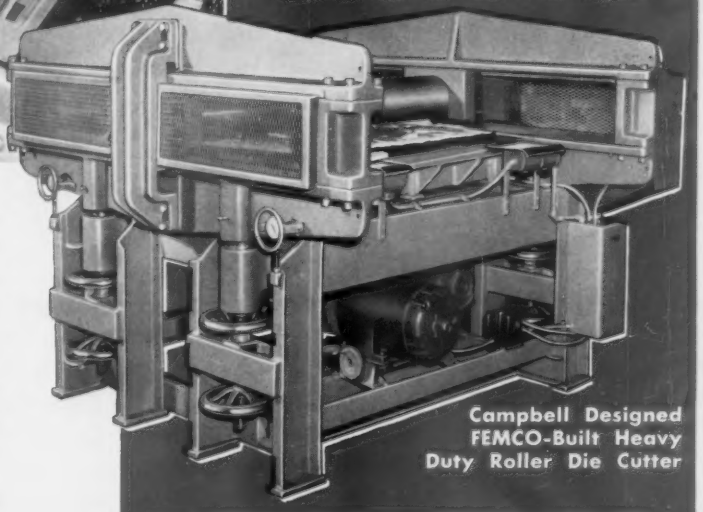
Here's how WOOSTER RUBBER tripled hourly production on KAR-RUGS with a

FEMCO Roller DIE CUTTER

HERE was the problem at Wooster Rubber Company, Wooster, Ohio. Orders for KAR-RUGS were piling up, production had to be increased.

Workers were hand-trimming the tough KAR-RUGS when a FEMCO Roller Die Cutter was installed (see photo at left) to do the trimming. Hourly production immediately more than tripled! Wooster Rubber now has *four* FEMCO Roller Die Cutters in operation.

What's your cutting or trimming problem? Are you looking for a way to boost production and lower costs? Let a FEMCO representative show you how. Send us a sample of your stock for trial cuts and a full report.



Campbell Designed FEMCO-Built Heavy Duty Roller Die Cutter

★FEMCO's Roller Die Cutters are available in the following bed sizes: 48″x 42″; 60″x 36″; 48″x 72″; 72″x 48″; and 72″x 66″. These machines will die-cut Foam Rubber, Polyvinyl, Polyester and Polyurethane stocks; Rubberized Hair; Felt; Textiles; Automotive Rubber Products; Fiberglas; Rubber Coated Stock; Rubberized Cork; Sponge Rubber, etc. Machine uses inexpensive steel rule dies which keep original die costs to a minimum. Write today for full details.

FEMCO'S V-BELT EQUIPMENT Includes Collapsible and Ring Molds, Curing Cages, Autoclave Type Belt Molders, Hydraulic and Manual Manipulators, Vertical and Horizontal Type Measuring and Matching Machines, Notching Machines, the new and improved V-Belt Skiving Machine, and a new and improved V-Belt Collapsible Building Drum. Call us first for this equipment.

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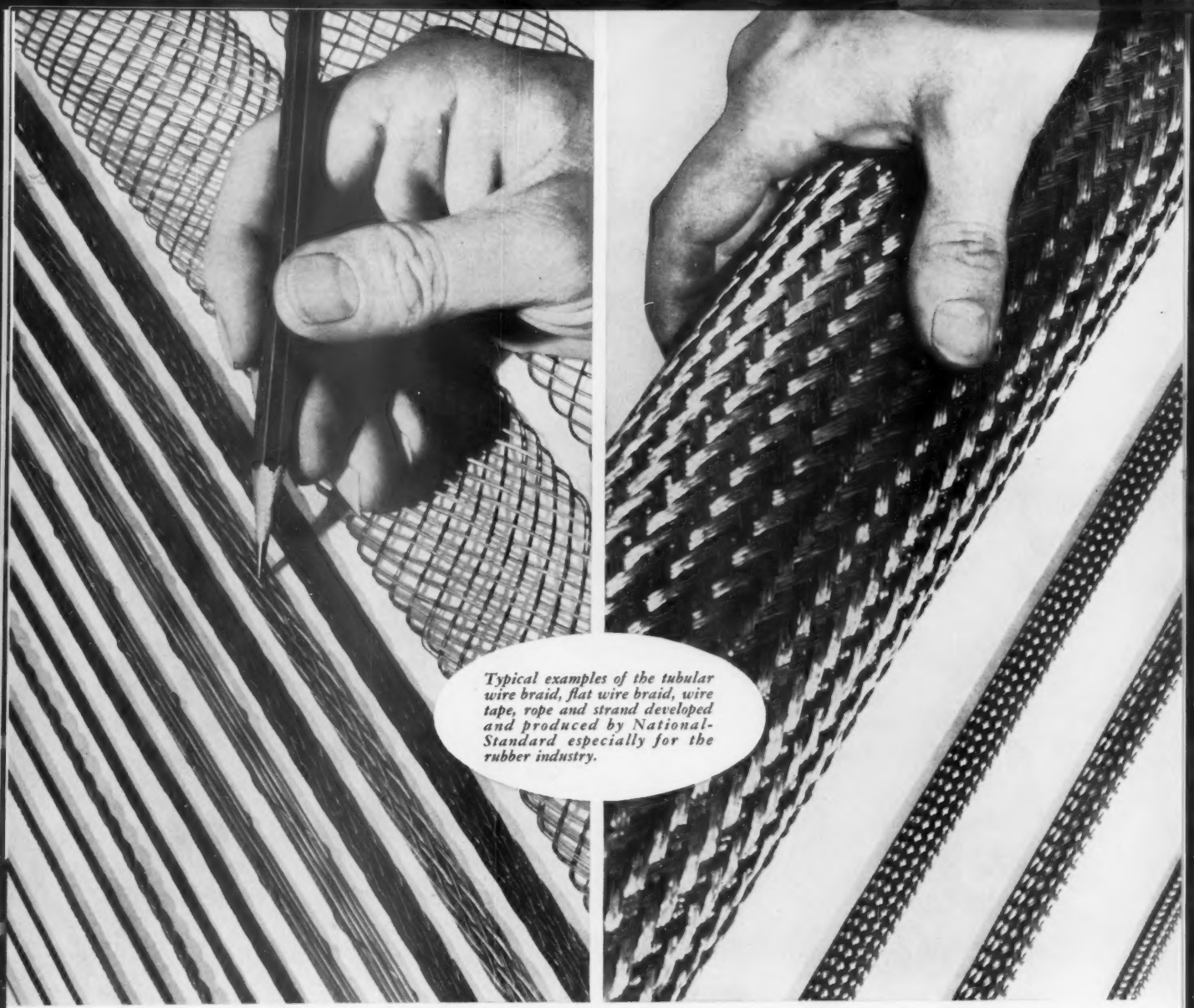

Typical examples of the tubular wire braid, flat wire braid, wire tape, rope and strand developed and produced by National-Standard especially for the rubber industry.

Wherever wire and rubber work together...

• For half a century, National-Standard has dedicated large scale research and engineering to improving the teamwork of wire and rubber. It is still going on . . . extensive work on wire fabrication, finish, corrosion, strength, elongation, adhesion and other factors that can affect the behavior and cost of your wire-in-rubber products.

So, wherever wire and rubber must work together, it is more than likely that National-Standard can contribute—particularly where new production or new service requirements are involved. We want to be of help . . . and are geared to do it well, without obligation. Check with us now . . . or anytime!

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The Shell Chemical plant at Torrance, California, is one of the nation's best equipped for production of butadiene-styrene types of synthetic rubber. Convenient location and diversity of product make Shell Chemical your logical source in the West.

Whether you need rubber for sheeting, molded goods, extruded goods, tires or other uses—check with Shell, your convenient source. When you encounter troublesome technical problems, the Shell Technical Service Laboratory will help you find practical solutions.

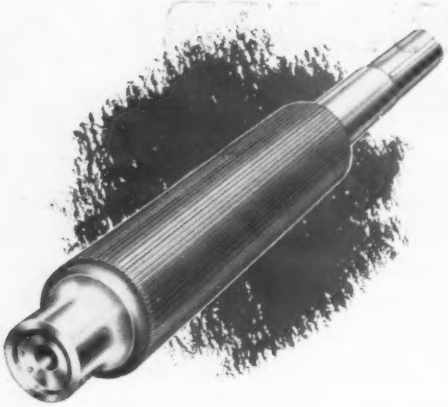
Write or call *Torrance, California*, whenever you have synthetic rubber in mind!

SHELL CHEMICAL CORPORATION

Synthetic Rubber Sales Division
P. O. Box 216, Torrance, California

SHELL

ARE YOU GETTING THE LONGEST POSSIBLE SERVICE LIFE FROM YOUR ROLLS?



You may be getting average service life from your chilled iron rolls, when you might be getting higher than average from a more metallurgically suitable roll.

We would like to have our metallurgists study your roll requirements. They may be able to recommend an alloy iron roll that will stand up much longer under the higher pressures, greater speeds and abrasions to which rolls are now subjected in processing rubber and plastics.

This may result in considerable savings through reduced down time and longer intervals between roll grinds.

The fact that so many long-established companies are users, and have been users of National rolls for almost 50 years is proof of their metallurgical correctness and precision finishing. They can be furnished to your specifications.

So the next time you are ordering iron or alloy iron rolls, call on National Roll & Foundry for their recommendations.

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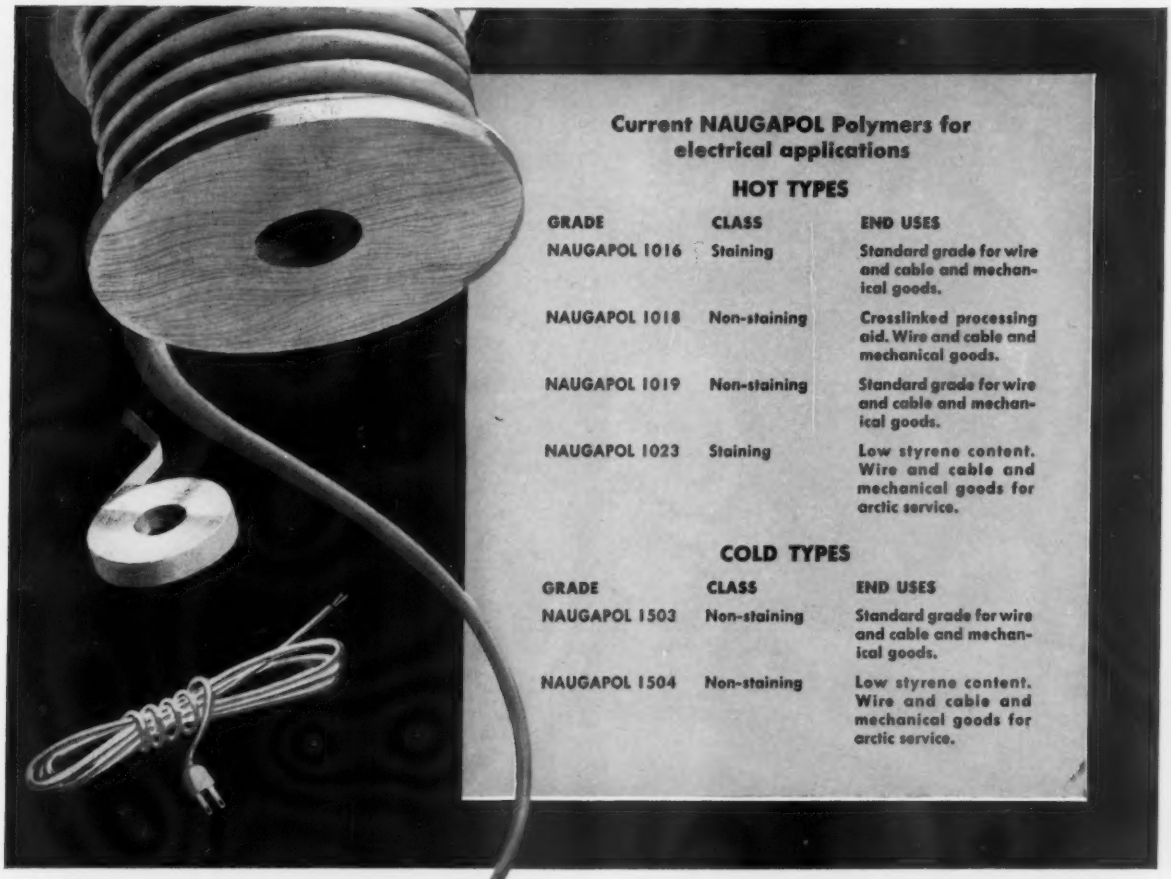
Naugatuck Naugapol



Current NAUGAPOL Polymers for electrical applications

HOT TYPES

GRADE	CLASS	END USES
NAUGAPOL 1016	Staining	Standard grade for wire and cable and mechanical goods.
NAUGAPOL 1018	Non-staining	Crosslinked processing aid. Wire and cable and mechanical goods.
NAUGAPOL 1019	Non-staining	Standard grade for wire and cable and mechanical goods.
NAUGAPOL 1023	Staining	Low styrene content. Wire and cable and mechanical goods for arctic service.

COLD TYPES

GRADE	CLASS	END USES
NAUGAPOL 1503	Non-staining	Standard grade for wire and cable and mechanical goods.
NAUGAPOL 1504	Non-staining	Low styrene content. Wire and cable and mechanical goods for arctic service.

Naugatuck answers wire and cable insulating problems with Naugapol

For products requiring excellent electrical properties and for those items designed for low moisture absorption, NAUGAPOL, butadiene-styrene copolymers, "Specially Processed" during the finishing operation, is the best obtainable.

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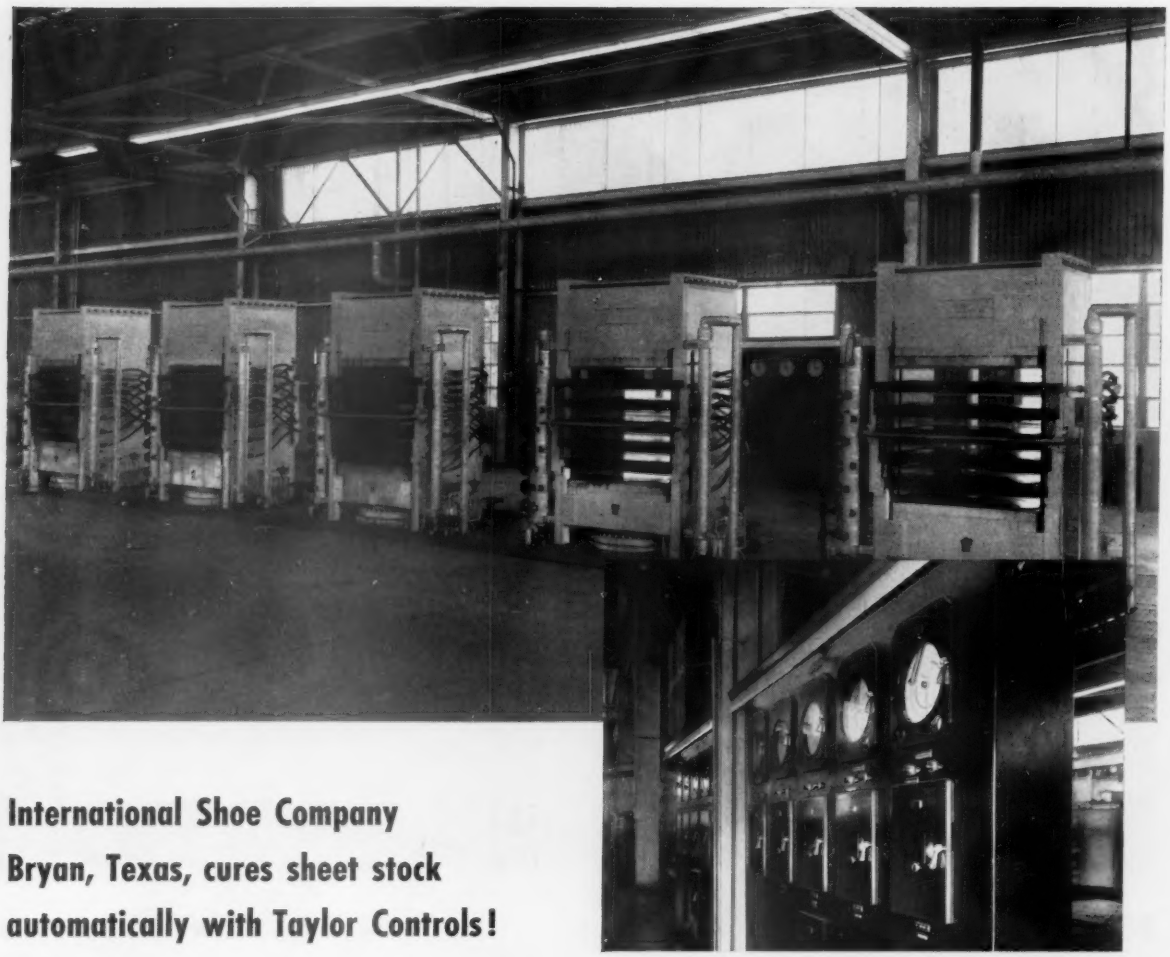

International Shoe Company Bryan, Texas, cures sheet stock automatically with Taylor Controls!

TAYLOR controls on their platen presses provide many benefits for the International Shoe Company.

1. **They protect International's fine name by insuring a uniformly high quality in their sheet stock.**
2. **Press performance is 100% predictable.**
3. **Since the entire sequence and duration of the cure is automatically controlled, production schedules can be set up so that the minimum number of operators can be used for the maximum number of presses. Skilled operators are thus released for other duties.**

The larger photograph above illustrates the battery of French Oil Mill Machinery Co. 42″ x 42″ platen presses, with one of the Taylor instrument panels in the background. Inset picture gives a close-up view of the control panel for ten 30″ x 30″ presses. The FULSCOPE* Controllers at top regulate platen temperature, while the FLEX-O-TIMER* Time Cycle Controllers automatically operate the presses, from closing them through bumping, timing the cure, operating the valves in proper sequence and opening of the presses.

*Reg. U.S. Pat. Off.

Note the "off-the-press" location of all instruments on central panels. This gives more convenient access to working areas and enables operators to check performance at a central point. Better "housekeeping" and care of equipment also results.

To find out how you can profitably put Taylor to work in your plant, call your Taylor Field Engineer, or write Taylor Instrument Companies, Rochester, N. Y., or Toronto, Canada.

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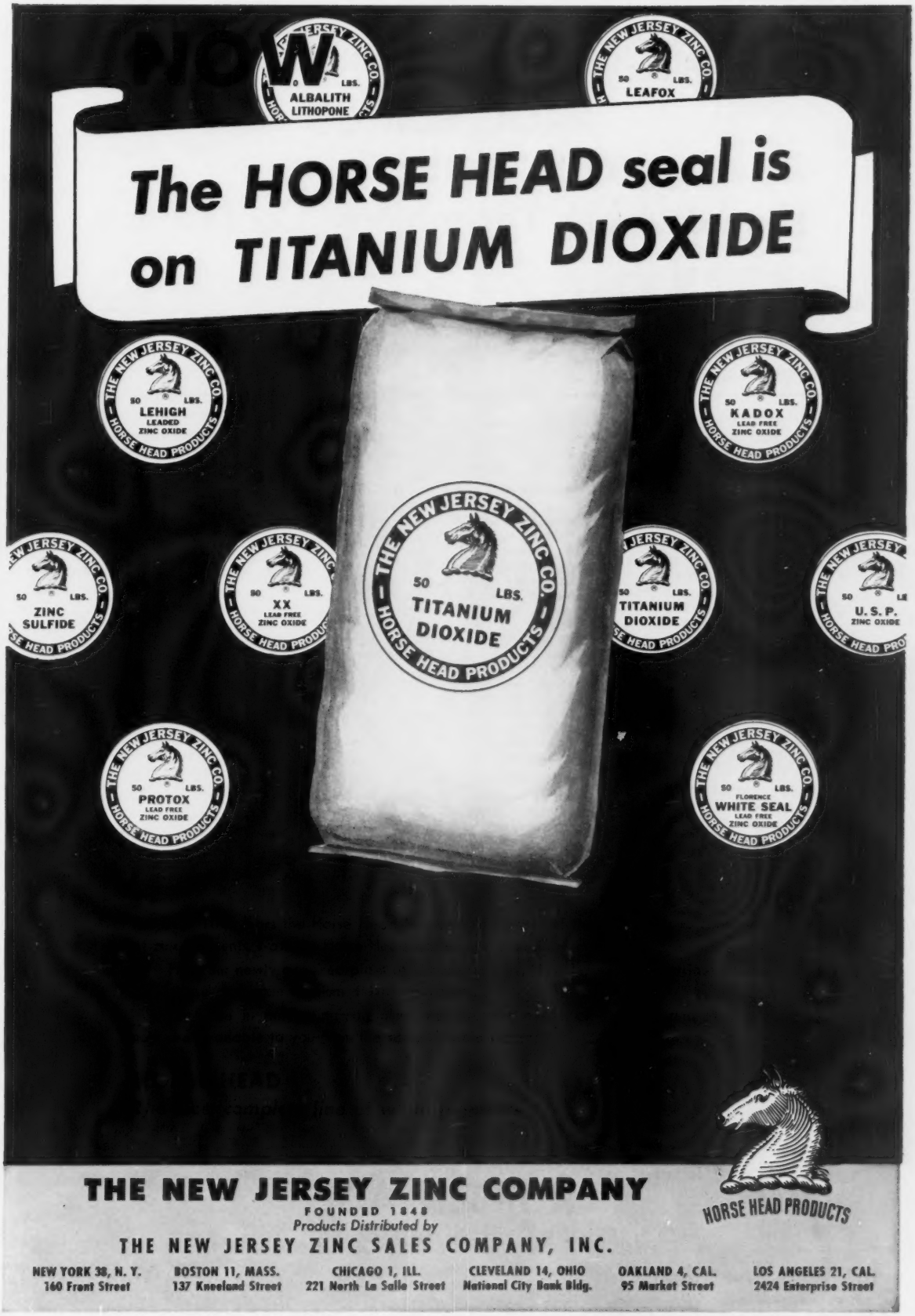
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Copies of all the papers presented at the Conference held in London on June 22-25, 1954, under the auspices of the Institution of the Rubber Industry, are presented in this volume, together with the discussions on each paper. The papers are world-wide in character and represent the latest thinking in the science and general technology of rubber. This informative volume is a **must** for all who wish to keep abreast of developments in the field.

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Variability of Hevea Latex. *W. L. Resing.*
Zinc Oxide Testing of Latex. *E. W. Madge, H. M. Collier,* and *J. L. M. Newnham.*
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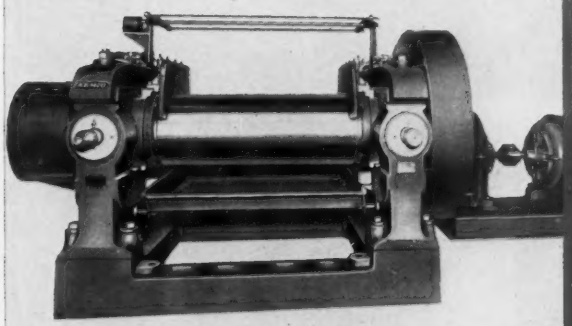

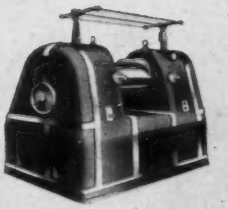

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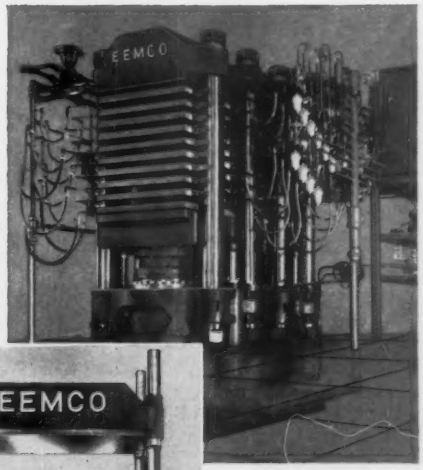

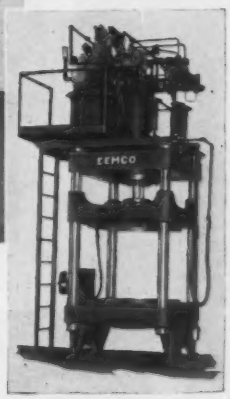

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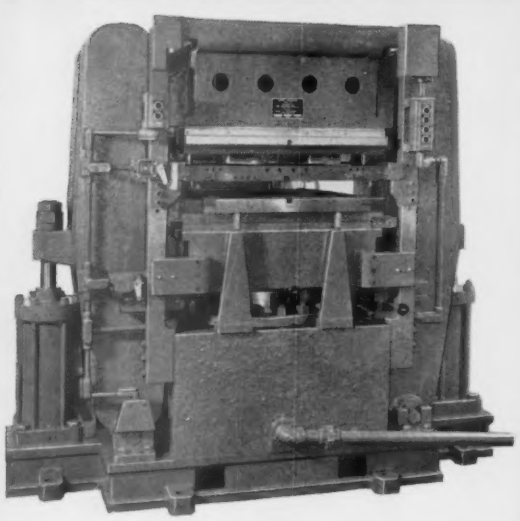
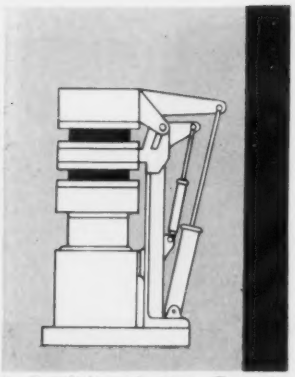
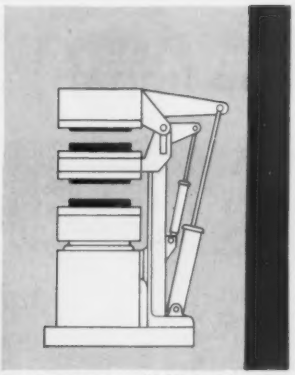


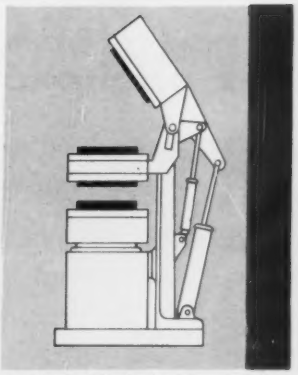
Above photo is a two deck or two opening press. However, the intermediate platen is a transfer mold and the plunger plate replaces the usual mold fastened to tilting head.



1. Completion of cure. Press is ready to open.

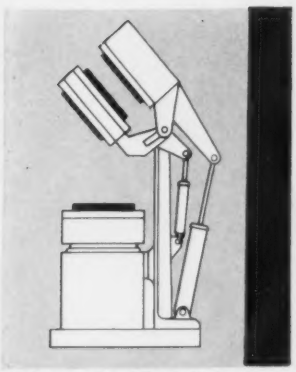


2. Press opens. Molds remain parallel during entire stroke of ram. This is necessary for deep cavity molds.

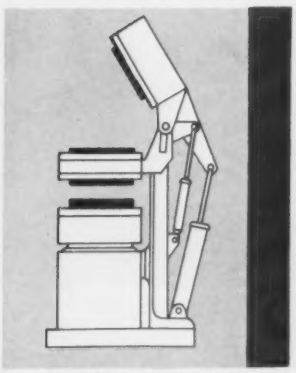


3. Head tilts back, exposing two halves of mold in top deck—cured articles are removed.

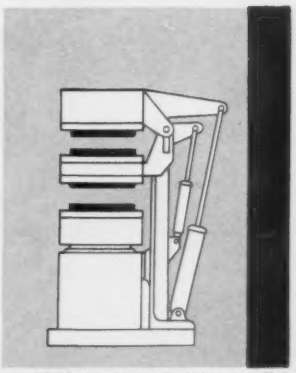
A TWO-OPENING TILTING HEAD PRESS



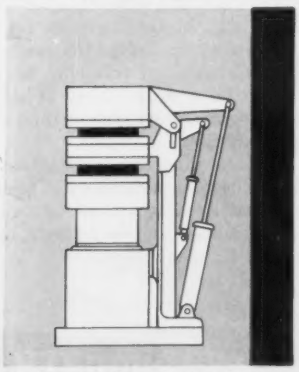
4. Intermediate platen tilts back, exposing two halves of mold in lower deck. Cured articles are removed. Fresh unvulcanized stock is placed in mold cavities.



5. Intermediate platen lowers into parallel position — unvulcanized stock is inserted in mold cavities.



6. Head is lowered into parallel position.



7. Ram travels upward and closes press. DIRECT AND FULL PRESSURE OF HYDRAULIC SYSTEM IS AVAILABLE THROUGHOUT ENTIRE STROKE OF RAM.

- Only the material moves in and out of the press. Molds remain in press, therefore mold halves **stay in register.**
- Cures two sets of molds at the same time.
- Timer, at prescribed intervals, **automatically** raises and lowers the ram, tilt head and intermediate platen.
- One operator, male or female, can attend to approximately as many presses as there are minutes in cure time. The operator simply removes cured articles and replaces with uncured, pre-formed stock.
- Press Sizes: 24-32-36"—up to 1,000-ton pressure.
- Two Opening Press can be used as a single opening press for extremely deep molds.

OF THE TILTING HEAD

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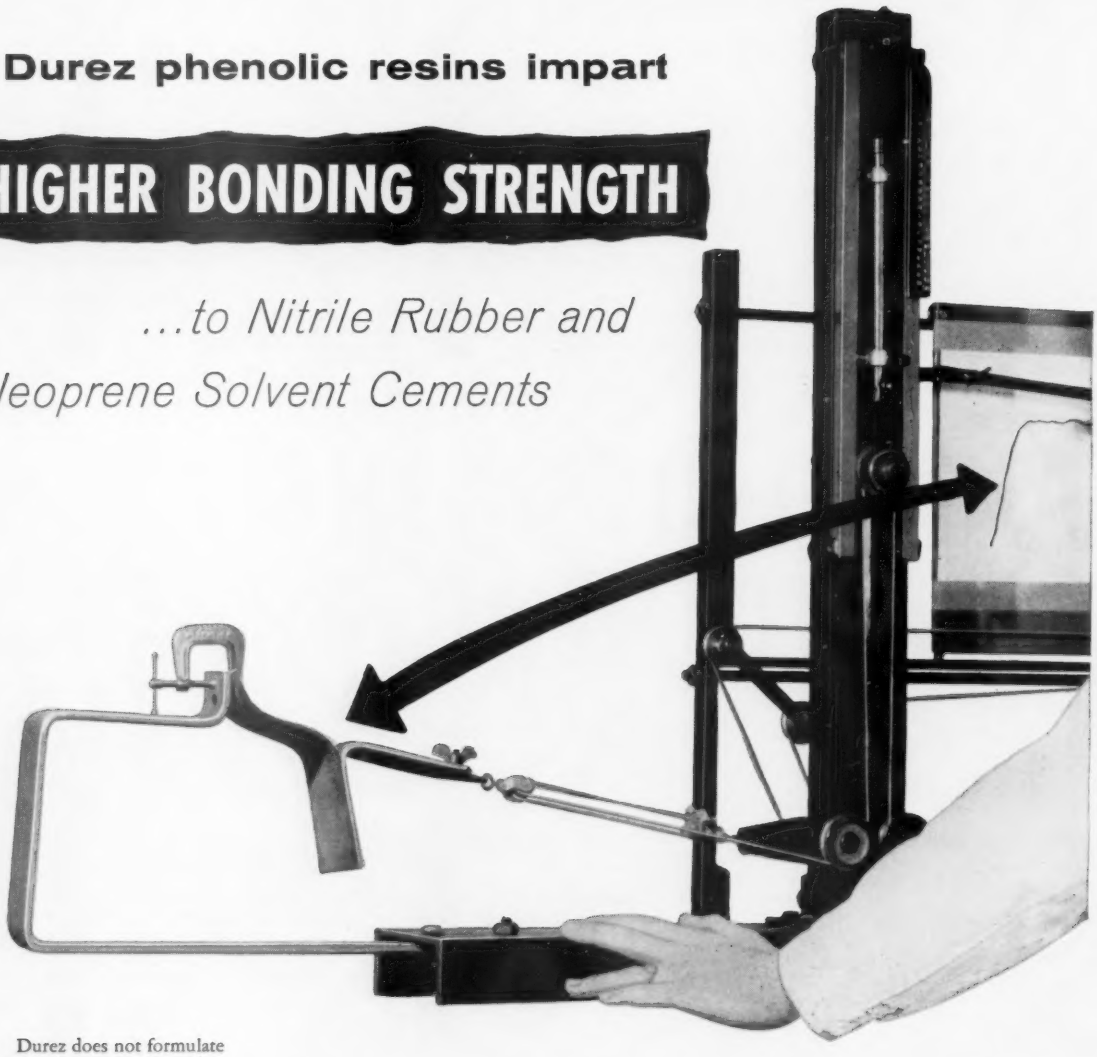

Durez does not formulate or manufacture adhesives, but serves those who use them by helping adhesive producers to make a better product.

Durez Phenolic Resins enable you to produce solvent-type adhesives having superior bonding strength. They are most effective as modifiers in nitrile rubber and Neoprene cements.

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In Neoprene solvent cements, a resin strengthens the film and provides a means of controlling the solvent release to produce the tack properties desired for specific applications. Cements of this type have good adhesion to a wide variety of surfaces including glass, steel and other metals, nylon, oak, and pine.

It will pay you to investigate the advantages of modifying your cements with Durez phenolic resins. As a starter, let us send you the latest edition of our bulletin on Resins for the Rubber Industry.

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new perspective on petrochemicals

Products based on methane, ethane and propane have grown phenomenally during the past decade. Petro-Tex believes that butane-derived chemicals such as butadiene, n-butylene 1, and n-butylene 2 will experience comparable growth. Soon these four-carbon building blocks will be freely available at attractive prices.

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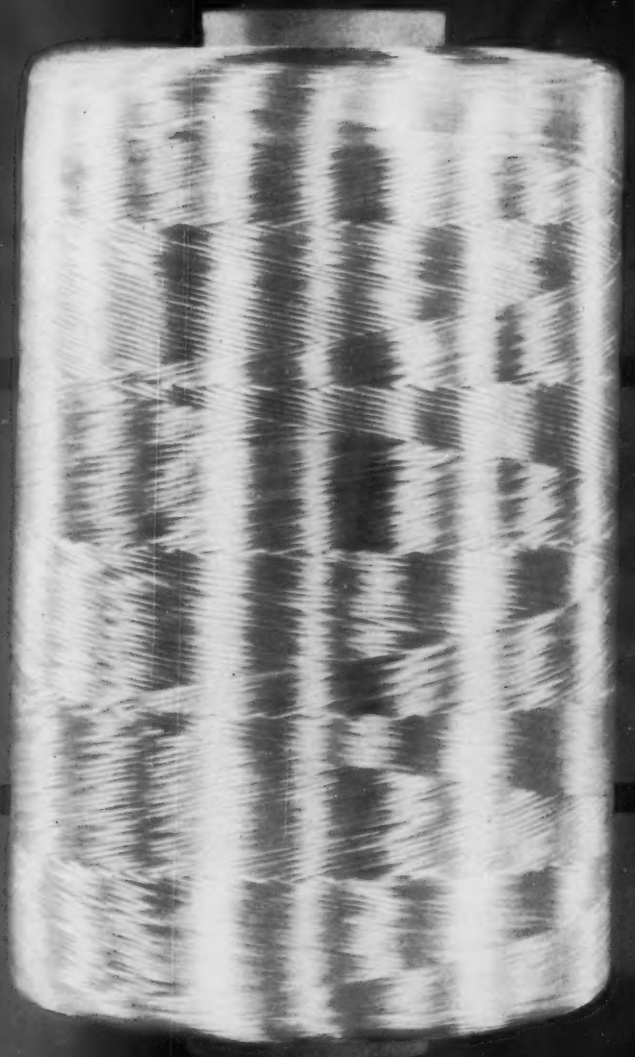

*caprolan**

NYLON HEAVY YARNS

Allied Chemical's new Caprolan heavy yarns are of particular interest to makers of:

Heavy Duck • Industrial Slings • Fire Hose • Cords & Braids
Upholstery Fabrics • Webbings • Conveyor Belt Fabrics
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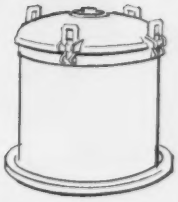
1. Cuts Plying Costs! Supplied in the total deniers you need, Caprolan nylon heavy yarns are engineered to your specifications without plies. No need to inventory costly finer deniers. Heavy yarns with nominal twist are supplied on knotless 10-pound parallel nonreturnable tubes.

2. Cuts Heat-Setting Cycles! Another money-saving advantage of these heavy yarns is that heat-setting cycles can be materially shortened because of Caprolan's workability with heat.



3. Minimizes Dyeing Problems! Heavy nylon constructions are much easier to dye when Caprolan heavy yarns are used. Allied's new fiber has a remarkable affinity for all classes of dyestuffs.

Other Heavy Yarns Can Be Engineered to Your Specifications In a Range from 2,000 to 50,000 Denier!

Now, from Allied Chemical—an important new tool for the textile industry—nylon heavy yarns engineered to your specifications! This completely new class of durable textile yarns eliminates need to ply multiple ends of finer deniers to achieve a higher total effect.

Caprolan heavy yarns are versatile, too. Whether you make duck, webbings, carpet, upholstery or any other type of heavy nylon fabric these heavy yarns will find a place in your mill. They are especially effective where toughness and high impact strength are important considerations.

These nylon heavy yarns are made exclusively by Allied Chemical. In addition to all of the known qualities of nylon, Caprolan heavy yarns offer such plus values as affinity for all classes of dyestuffs, *deep* dyeing and uniform level shades.

These new heavy yarns already are in commercial use in important mills and evaluation programs are under way in many others. If you would like more information, technical assistance, or would like to evaluate Caprolan heavy yarns in your own mill, write:

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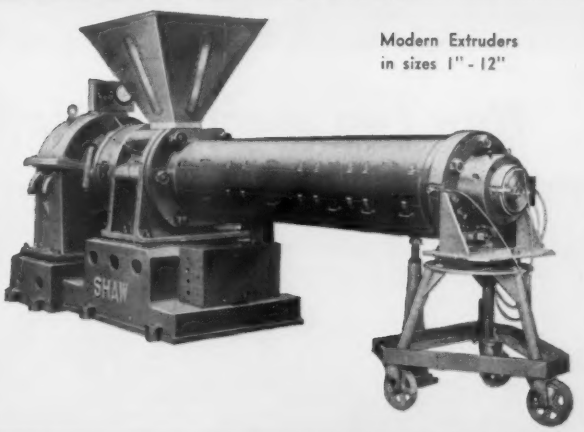
To produce quality extrusions without the risk of imperfection requires temperature control to a fine degree. These Shaw Extruders provide it exactly. There is all electric heating in separate zones and each zone is independently controlled by proportioning instruments.

Various screw and die designs are available for the production of piping, sheeting, miscellaneous sections, and the insulation and sheathing of cables, etc. Great attention has been paid to bearings and barrel support to avoid wear and vibration.



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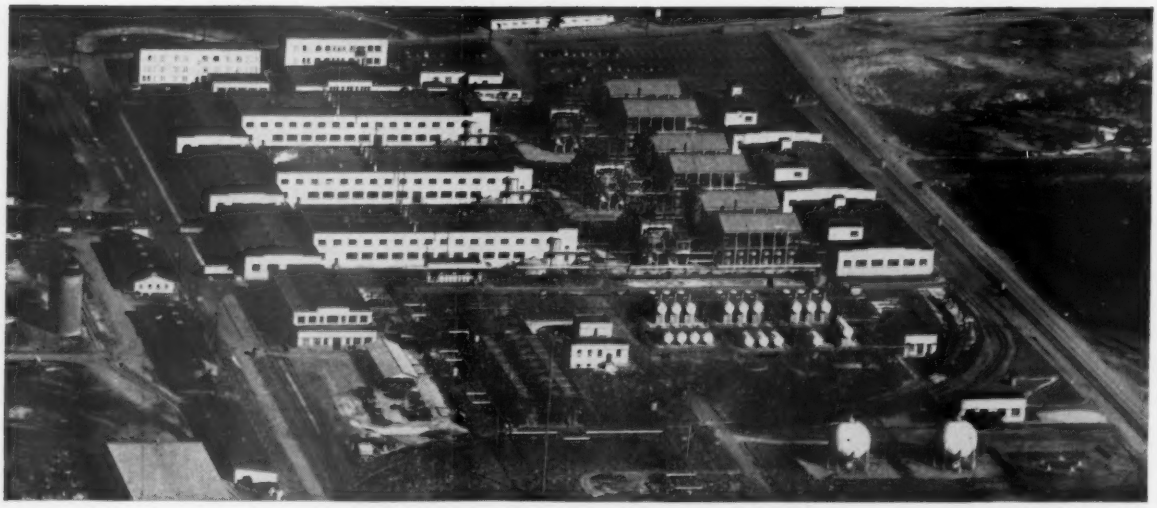
Port Neches, Texas

Now two plants to supply rubber users



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Goodrich-Gulf Chemicals is expanding and modernizing facilities to keep pace with industry's demand for Ameripol Rubber . . . for tires and scores of industrial products.

Ameripol is available in many forms—backed by Goodrich-Gulf's years of experience in the development and perfection of man-made rubber.

Look for new things to benefit industry from Goodrich-Gulf research and production facilities.

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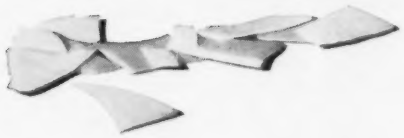
Here's news!

Baker CALCIUM NITRATE, Tech.
ZINC NITRATE, Tech.

in THIN FLAT FLAKES



- *Faster dissolving*
- *Uniform purity—lot after lot*
- *Controlled water of hydration*
- *Easier to handle*

Look over the photograph above, reproduced to actual size. Note the thin flakes with large surface area. THIN FLAKES go into solution FAST – you save time and money. They are easy to handle. These chemicals in *flake* form represent another Baker first.

Latex processors gain better control of coagulation because of the controlled high assay and known water of hydration. This uniform purity, controlled pH and freedom from extraneous matter insure better quality in your finished goods with fewer rejects.

These chemicals are produced to meet precise specifications. In the informative typical analysis shown below, note the very low ammonium nitrate content in Baker Calcium Nitrate. The exceptionally low copper and manganese contribute to longer life for your latex products, with less tendency to oxidize and become brittle or too soft.

These features of Baker Calcium Nitrate and Zinc Nitrate also are helpful to manufacturers of rustproofing specialties, textile finishes, pigments, adhesives and lithographic materials.

Because of the low melting points and deliquescent nature of these chemicals, they are packaged with polyethylene liners and are stored in an air conditioned warehouse at a temperature below 85°F.

Write for samples and prices for these new *flaked* products, Calcium and Zinc Nitrate Technical.

CALCIUM NITRATE, Technical Flake	*Typical analysis*
Assay (as $Ca(NO_3)_2$)	71.8 %
Water of Hydration	27.6 %
Insoluble and NH_4OH Ppt.	0.03 %
Ammonium Nitrate (NH_4NO_3)	0.1 %
Magnesium & Alkalies (as NO_2)	0.4 %
Iron (Fe)	0.0003%
Copper (Cu)	0.0004%
Manganese (Mn)	0.001 %
pH of 5% Solution	6.3
Thin (0.025 in.) flakes about ½ inch in size with the following typical mesh analysis:	
On U.S. No. 4	45%
Thru U.S. No. 20	8%

ZINC NITRATE, Technical Flake	*Typical analysis*
Assay (as $Zn(NO_3)_2$)	74.2 %
Water of Hydration	25.6 %
Insoluble Matter	0.0008%
Iron (Fe)	0.001 %
Lead (Pb)	0.005 %
pH of 5% Solution	5.1
Thin (0.035 in.) flakes about ½ inch in size with the following typical mesh analysis:	
On U.S. No. 4	26%
Thru U.S. No. 20	9%

PURITY BY THE TON
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REAGENT • CHEMICALS • FINE • INDUSTRIAL
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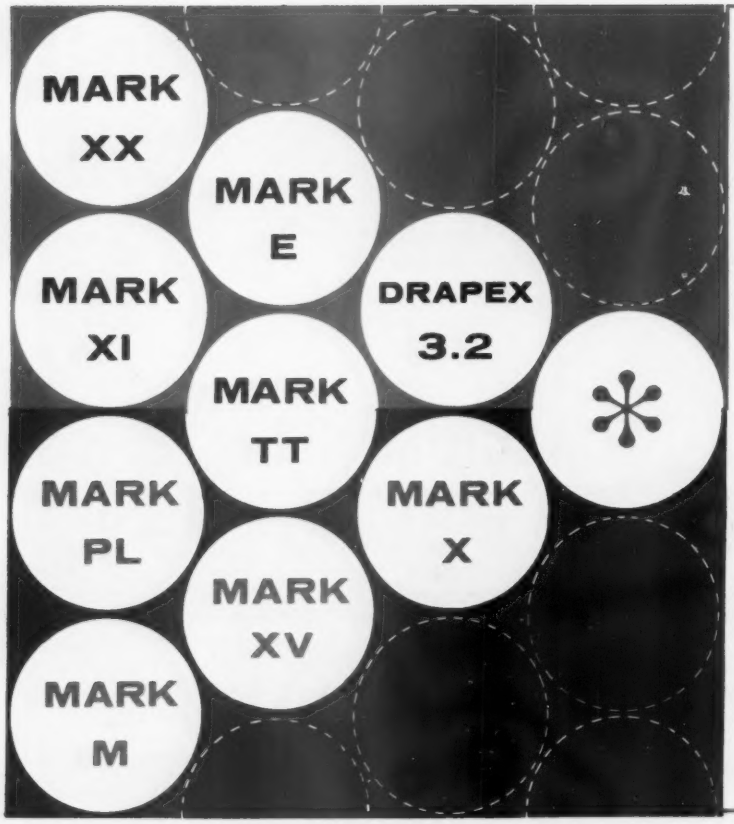

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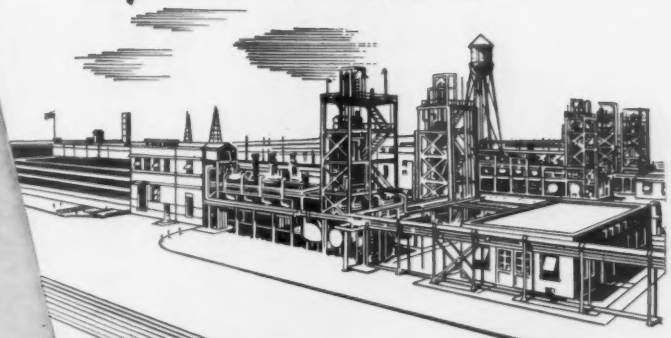

FR-S

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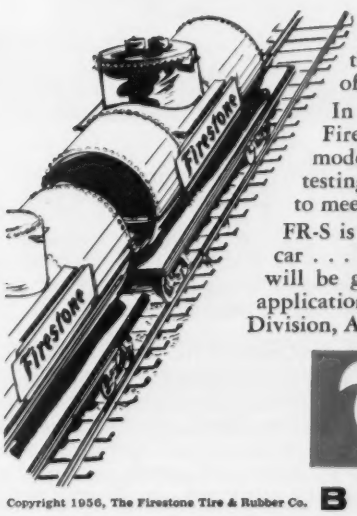
Made Only By

Firestone

the World's Largest Rubber Producer



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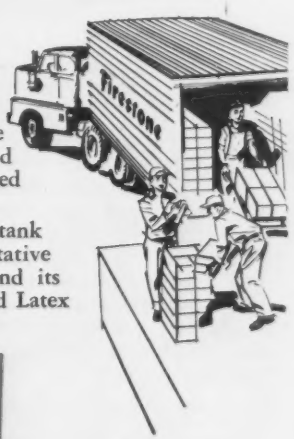
In order to develop and produce FR-S, every step in Firestone's synthetic manufacturing process had to be modernized and new scientific methods of control and testing established . . . even the raw materials were required to meet NEW, HIGHER STANDARDS.

FR-S is available in latex or dry rubber . . . in drums or tank car . . . bales or carload. A Firestone Technical Representative will be glad to give you further information on FR-S and its applications. Phone or write Firestone, Synthetic Rubber and Latex Division, Akron, Ohio.



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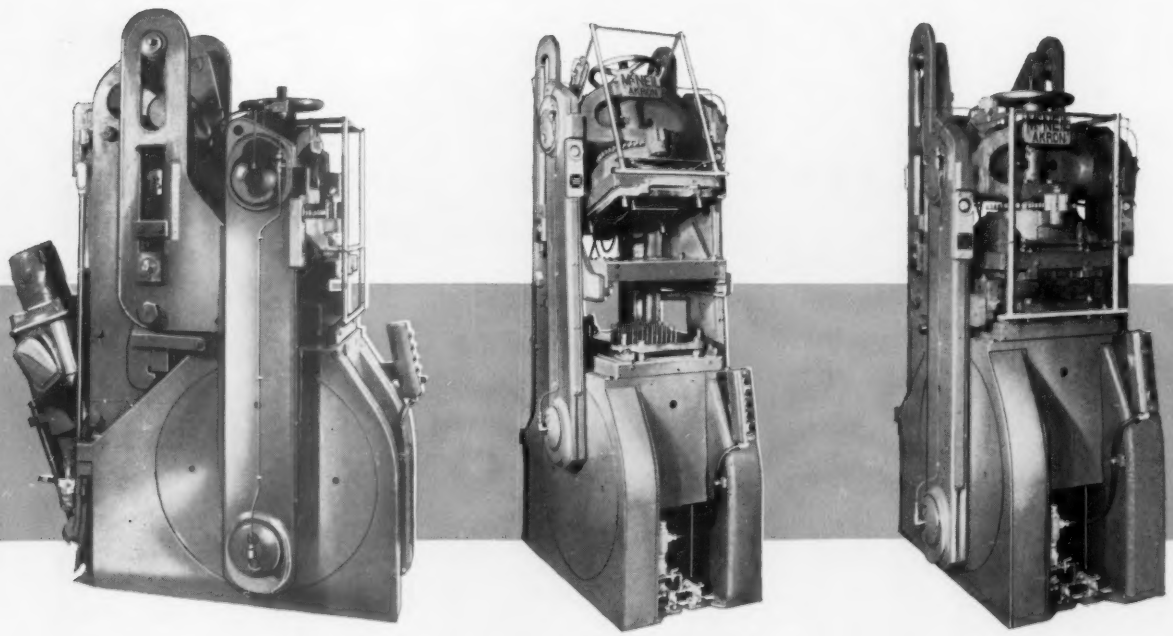
THE NEW

McNEIL-AKRON MODEL 300

PROVIDES AUTOMATIC, MECHANICAL HANDLING

to speed mechanical goods production & slash mechanical goods cost



You've been needing it . . . Here it is — the new McNEIL-AKRON Model 300—a faster-operating, cost-cutting 18″ x 18″ Mechanical Goods Press. It's a new BIG BROTHER to our popular, speedy 10″ x 16″ BANTAM. It's specially designed for quick transfer molding of small, close-tolerance products. It's another McNeil FIRST! THE "300" IS AUTOMATIC, FAST, EFFICIENT — A high production unit that handles 2-, 3- and 4-plate molds automatically and speedily. It is equipped with an automatic, adjustable knockout mechanism that provides greater latitude to mold design. Hand work and mold maintenance costs are held to a minimum.

THE "300" IS VERSATILE — Can produce a wide variety of jobs within the limits of its Zero to 300,000 lb. total platen pressure. Electrically heated platens give any workable temperature desired.

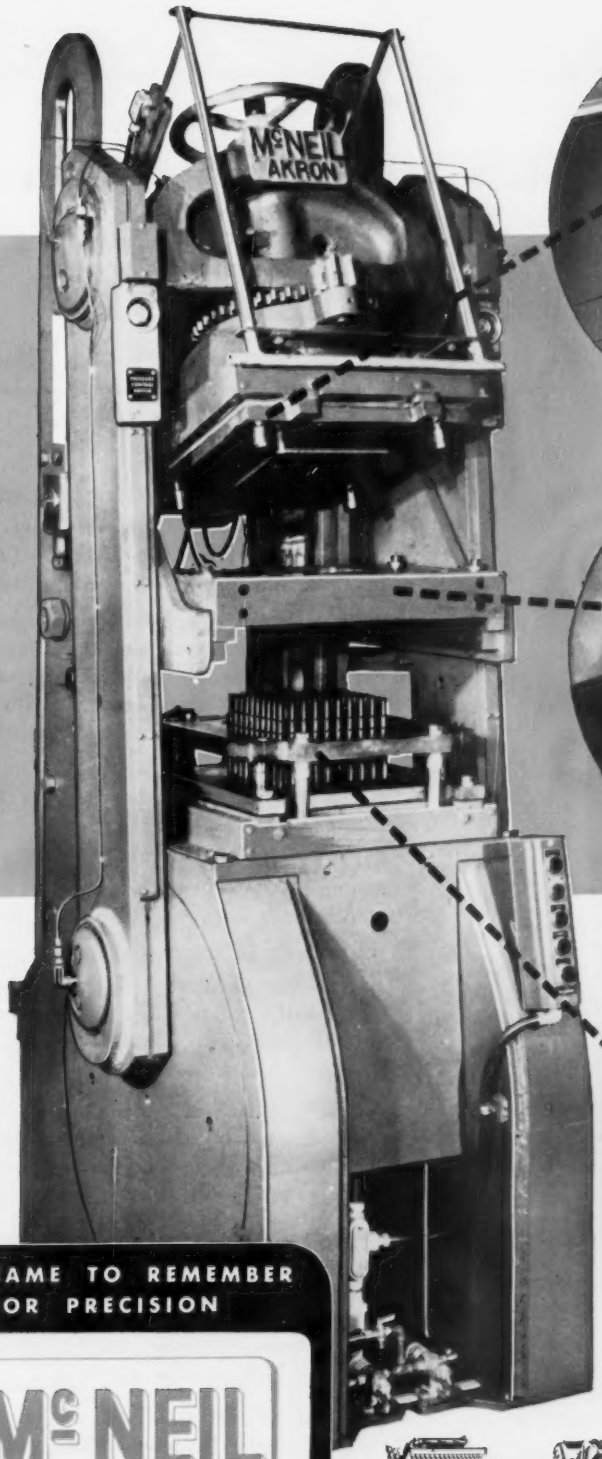
THE "300" IS DEPENDABLE — Built to McNeil PRECISION and quality standards, it is as reliable and maintenance-free as only a McNEIL-AKRON Press can be!

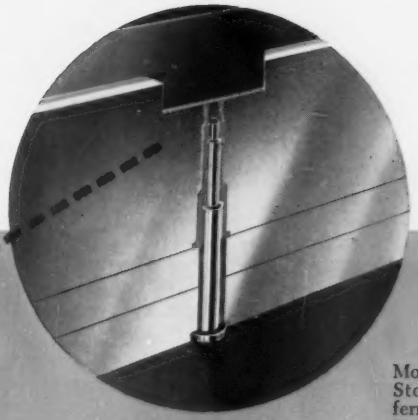
THE "300" IS COMPACT — Measures only 2′11½″ x 5′9½″ x 7′5¾″ closed or 8′4¾″ open. Requires only 18 sq. ft. of floor space.

THE "300" IS A PROFIT-PRODUCER — Economical to buy, own and operate, it will quickly pay for itself in profitable, headache-free production.

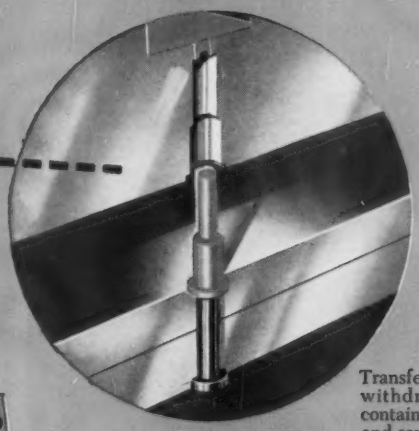
COMPLETELY MECHANICAL OPERATION

The mold illustrated is a 4-plate transfer mold consisting of plunger plate; well and cavity plate; stripper plate; core plate. Machined to very close tolerances from heat-treated steel, this mold will operate over long production runs at a minimum of maintenance or down time because it is completely mechanically operated by the McNeil "300".

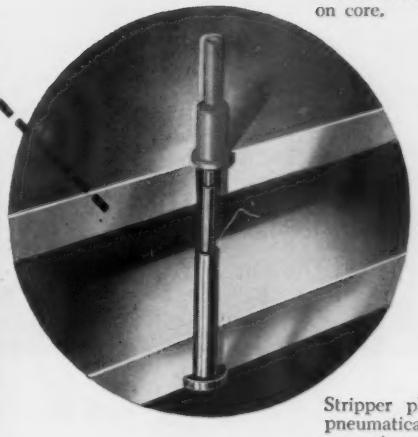




Mold completely closed. Stock has been transferred from transfer well into cavity.



Transfer plunger has been withdrawn. Mold plate containing transfer well and cavities is being lifted by side lifting plates provided on the McNeil "300". Product remains on core.



Stripper plate is raised pneumatically, completely removing product from core.

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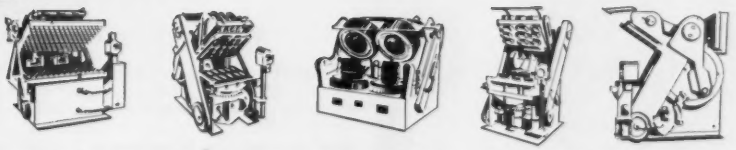

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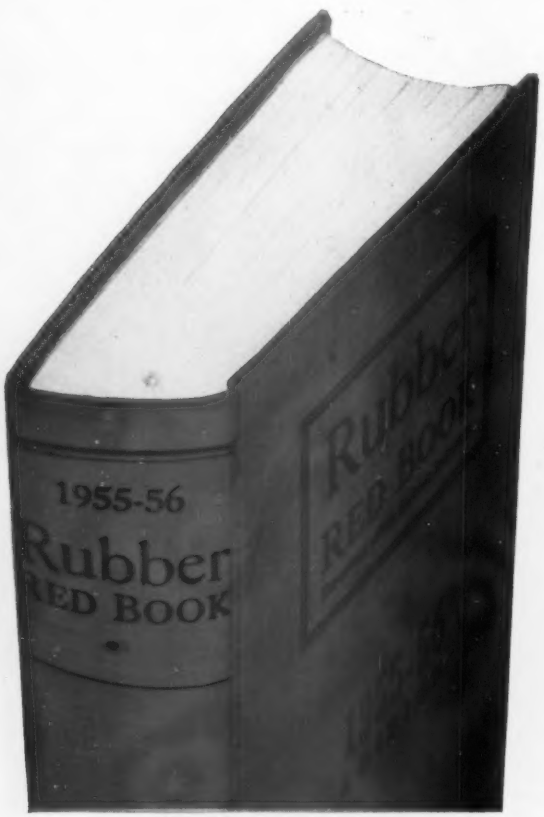

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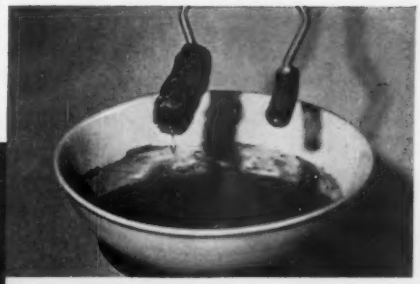

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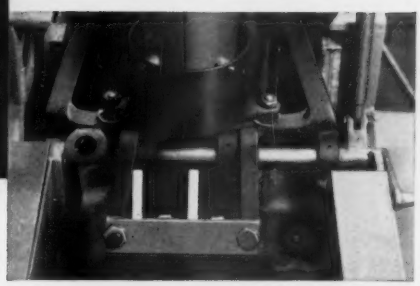

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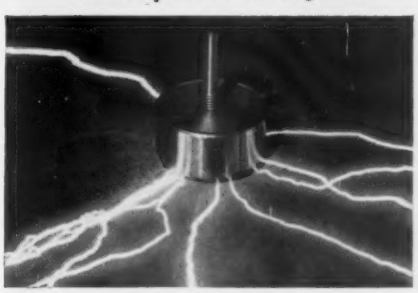

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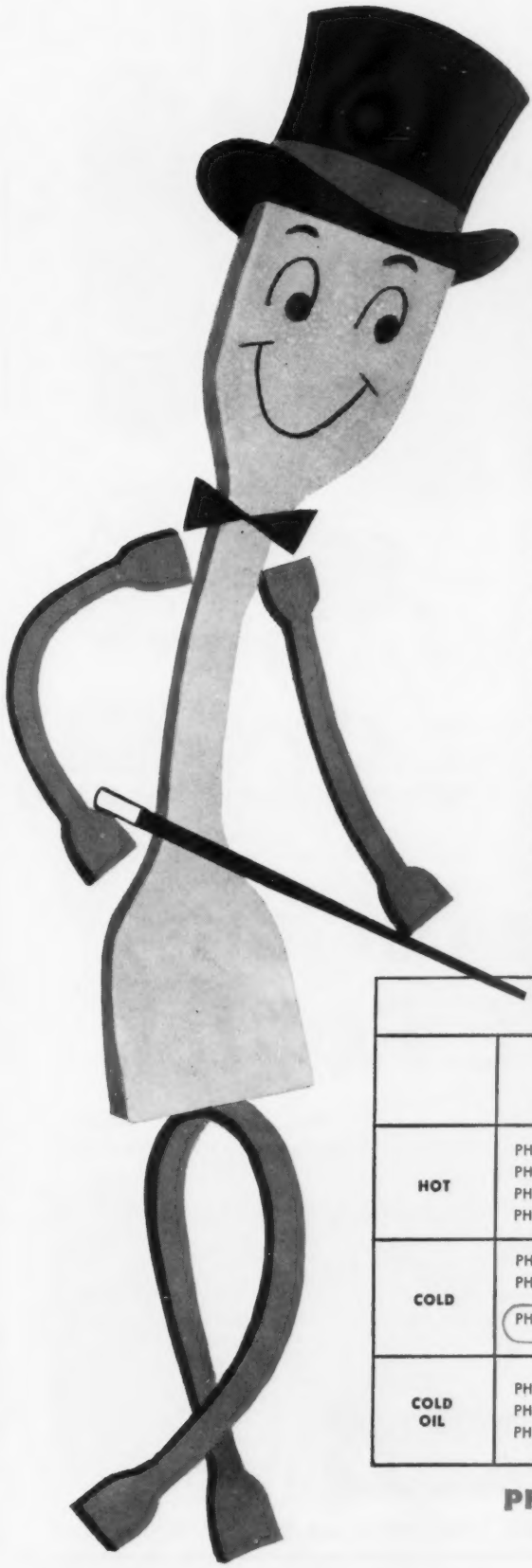

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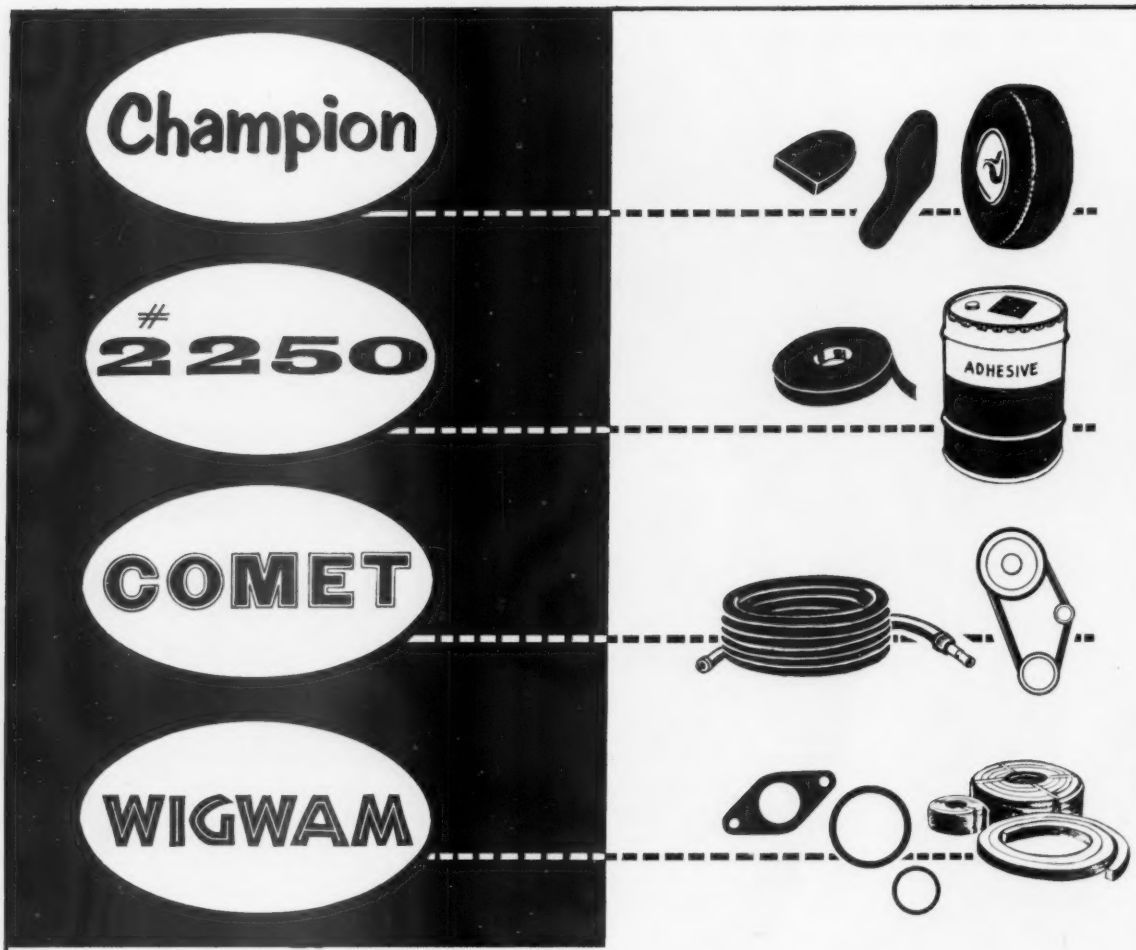

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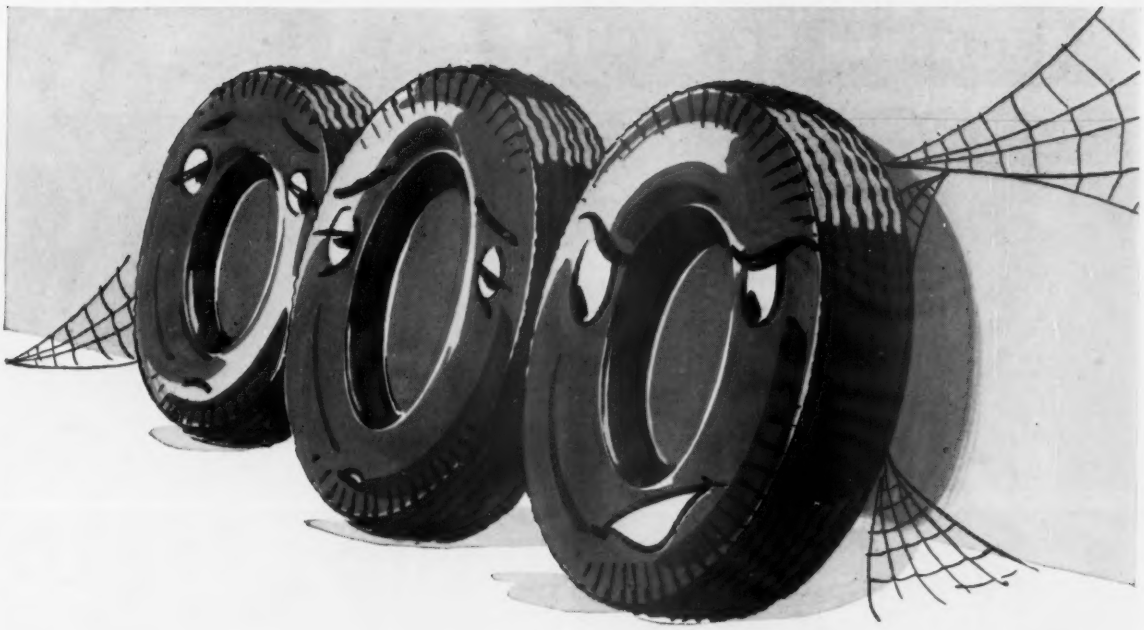

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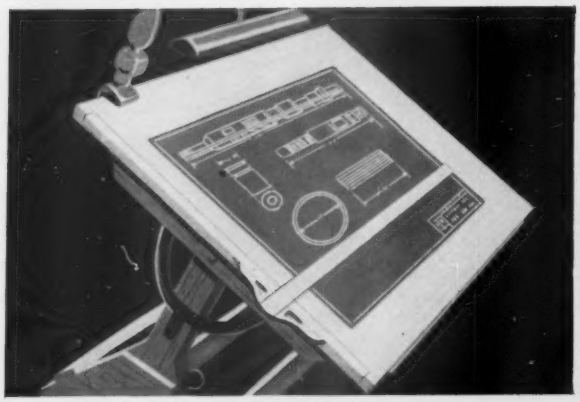

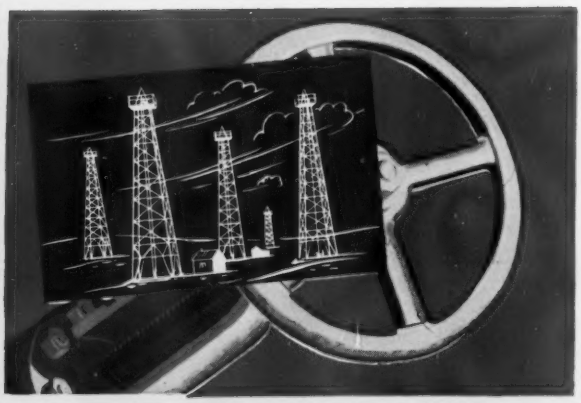

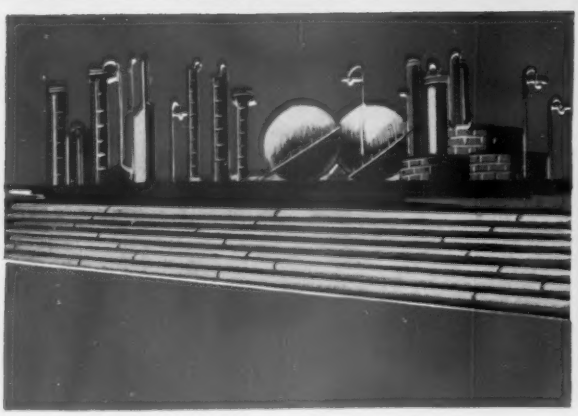

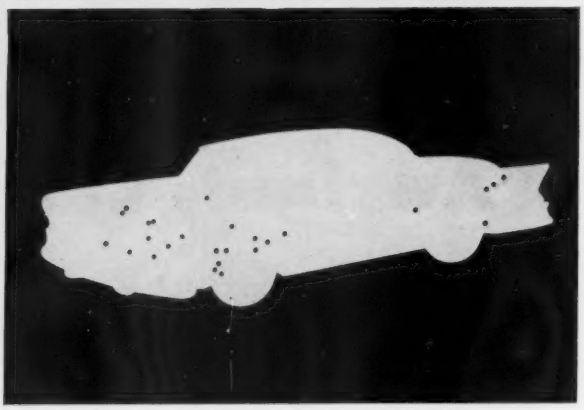

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Rubber Age

Vol. 79, No. 3 JUNE, 1956

The Effect of High Temperature on the Properties of Organic and Silicone Rubbers

By G. M. KONKLE, J. T. McINTYRE and J. V. FENNER
Product Engineering Laboratories, Dow Corning Corporation, Midland, Mich.

THE need for rubber that will give satisfactory service at high temperatures is becoming increasingly urgent. Considerable data have been published on the effect of heat aging on various types of rubbers but properties were measured at room temperature after exposure to elevated temperatures. Little information is available on properties determined at elevated temperatures, especially combined with aging at elevated temperatures.

Van Rossem and van der Meyden *(1)*, Somerville and Russell *(2)*, and Morron, Knapp, Linhorst and Viohl *(3)* presented data on natural rubber measured at elevated temperatures. Borders and Juve *(4)* determined the tensile strength at temperatures from room temperature to 180°C. of butadiene polymers and various copolymers with butadiene compared with natural rubber, Butyl and neoprene. Boonstra *(5)* compared the tensile strength of natural rubber at temperatures from —20° to 120°C. with Butyl, neoprene, nitrile and GR-S. Peter *(6)* measured the properties of silicone rubber, neoprene, nitrile and Butyl rubber at elevated temperatures and also included aging at 125°C. with testing at that temperature. None of these investigations, however, included the more recent polymers designed for high temperature use. Only Peter *(6)* combined any degree of heat aging with testing at elevated temperatures.

Note: This paper is based upon the paper of similar title presented before the Division of Rubber Chemistry, American Chemical Society, Philadelphia, Penna., November 2, 1955.

Many of the polymers now available are recommended for high temperature applications. This paper presents data on tensile strength and elongation of many of these rubbers at elevated temperatures. Samples were also aged as well as tested at various temperatures.

The elastomers investigated were natural rubber, GR-S, Butyl, neoprene, nitrile, polyacrylic, 1,1-dihydroperfluorobutyl acrylate (Poly FBA), a copolymer of an acrylic ester and acrylonitrile (Acrylon BA-12), chlorosulfonated polyethylene (Hypalon) and silicone rubber (Silastic).

One formulation for each of the above polymers was chosen. The formulations selected were recommended for heat stability by the polymer manufacturers or rubber chemical suppliers. These formulations are shown in Table I.

The formulations used for all of the elastomers except silicone contained carbon black. Boonstra *(5)* found that carbon black increased the strength of natural rubber and many synthetic rubbers at elevated temperatures.

Properties at elevated temperatures were determined in an oven mounted on a Scott IP-4 inclined plane tensile tester. Room temperature values determined on a Scott L-3 tensile tester compared closely with the room temperature values obtained on the IP-4. It was felt, therefore, that the values obtained on the inclined plane tester were comparable with values obtained on the type of tensile tester specified in A.S.T.M. D412-51**T.**

TABLE I—FORMULATIONS USED IN THE INVESTIGATION

Natural Rubber		Nitrile		GR-S		Neoprene	
Smoked Sheet	100.0	Paracril C	100.0	GR-S-1500	100.0	Neoprene WRT	100.0
Stearic Acid	2.0	Stearic Acid	1.0	Zinc Oxide	5.0	Stearic Acid	0.5
Zinc Oxide	5.0	Zinc Oxide	5.0	SRF Black (Furnex)	25.0	Zinc Oxide	5.0
FT Black (P-33)	40.0	Sulfur	0.2	MPC Black (Standard Micronex)	25.0	Magnesium Oxide	4.0
Age Rite Resin D	2.0	SRF Black (Furnex)	75.0	Age Rite Resin D	2.0	SRF Black (Furnex)	20.0
Tetramethylthiuram Disulfide (Methyl Tuads)	3.0	Dioctyl Sebacate (Plexol 201)	10.0	Tetramethylthiuram Disulfide (Methyl Tuads)	3.0	MPC Black (Standard Micronex)	25.0
Tellurium (Telloy)	0.5	Flexamine	1.0	Benzothiazyl Disulfide (Altax)	0.5	Flexamine	1.5
Press Cure: 45 Min. @ 290°F.		Tetramethylthiuram Disulfide (Methyl Tuads)	3.0	Press Cure: 30 Min. @ 307°F.		Petrolatum	2.0
		Press Cure: 30 Min. @ 310°F.				Aranox	1.0
						Press Cure: 45 Min. @ 274°F.	

Polyacrylic		Acrylon		Poly FBA		Silicone Rubber	
Hycar 4021	100.0	Acrylon BA-12	100.0	Poly FBA	100.0	Silastic 401 Gum	100.0
Stearic Acid	1.0	Stearic Acid	1.0	HAF Black (Philblack O)	35.0	Dow Corning Silica	30.0
HMF Black (Statex 93)	40.0	SRF Black (Furnex)	50.0	Age Rite Resin D	2.0	Celite Super Floss	19.0
Sulfur	0.5	Sulfur	1.0	Sulfur	1.0	Iron Oxide	2.8
Trimene Base	3.0	Triethylene Tetramine	1.0	Triethylene Tetramine	1.0	Benzoyl Peroxide*	1.4
Press Cure: 45 Min. @ 310°F.		Press Cure: 30 Min. @ 310°F.		Press Cure: 60 Min. @ 300°F.		Press Cure: 5 Min. @ 260°F. plus Oven Cure of 24 Hrs. @ 482°F.	

Hypalon		Butyl	
Hypalon	100.0	GR-I-15	100.0
Stearic Acid	10.0	Zinc Oxide	5.0
Magnesium Oxide	10.0	MAF Black (Philblack A)	40.0
Litharge	20.0	SRF Black (Furnex)	20.0
SRF Black (Furnex)	10.0	Dibenzoyl-p-Quinone Dioxime (Dibenzo GMF)	9.0
Age Rite Resin D	2.0	Red Lead	8.0
Benzothiazyl Disulfide (Altax)	2.0	Sulfur	2.0
Press Cure: 30 Min. @ 302°F.		Press Cure: 60 Min. @ 307°F.	

Polymer suppliers: Paracril—Naugatuck Chemical Division, U. S. Rubber Co.; Neoprene WRT and Hypalon—Elastomers Division, E. I. du Pont de Nemours & Co.; Hycar 4021—B. F. Goodrich Chemical Co.; Acrylon BA-12—American Monomer Corp.; Poly FBA—Minnesota Mining & Manufacturing Co.; Silastic 401 Gum—Dow Corning Corp.

* Added in the form of 50% benzoyl peroxide—50% silicone fluid paste, Luperco ASF.

Electric heating units were mounted in a section separated from the oven in which the samples were tested. Air was circulated by means of a fan to assure even temperature distribution. A thermocouple mounted near the sample position indicated the temperature continuously.

Samples were conditioned 15 minutes at test temperature before pulling. This exposure time was found to be sufficient to reach temperature equilibrium without causing excessive deterioration due to heat aging as shown in Table II. Undoubtedly some heat aging of the rubbers compounded with organic polymers occurred even in this short time at the higher test temperatures.

Long time aging at test temperatures was done in air circulating ovens. To eliminate the possibility of contamination, care was taken, especially during the initial exposure periods, to age only one type of rubber at a time in each oven. Aging with all surfaces of the samples exposed to hot air is undoubtedly more severe than that encountered in most applications but it is a useful method for comparing the heat stability of compounds.

The hardness of samples at test temperatures was also measured. The parts of a Shore "A" durometer that came in contact with the test samples were heated and hardness was measured immediately after samples were taken from the ovens. Changes in hardness showed poor correlation with the other effects of temperature, however, because, with the exception of silicone, Poly FBA and Acrylon, all of the elastomers included in these studies decreased in hardness when exposed to elevated temperatures for short times. After heat aging, all except the natural and Butyl rubber samples increased in hardness. There was usually an inverse relationship between hardness and elongation after heat aging. There were exceptions, especially in the Butyl samples, where no definite trend was indicated.

This paper will, therefore, be concerned primarily with the effect of temperature on the tensile strength and elongation of various types of rubber.

Effects of Testing at Elevated Temperatures

The immediate effects of high temperature on tensile strength and elongation were measured first. Samples were conditioned at test temperatures for only 15 minutes to permit them to reach temperature equilibrium before tensile strength and ultimate elongation were measured. Tensile strength and ultimate elongation of the various test samples at elevated temperature are shown in Figure 1.

Measured at progressively higher temperatures, test samples of natural rubber, GR-S and neoprene showed the most rapid loss of tensile strength and elongation. These values, measured at 150°C. after 15 minutes at

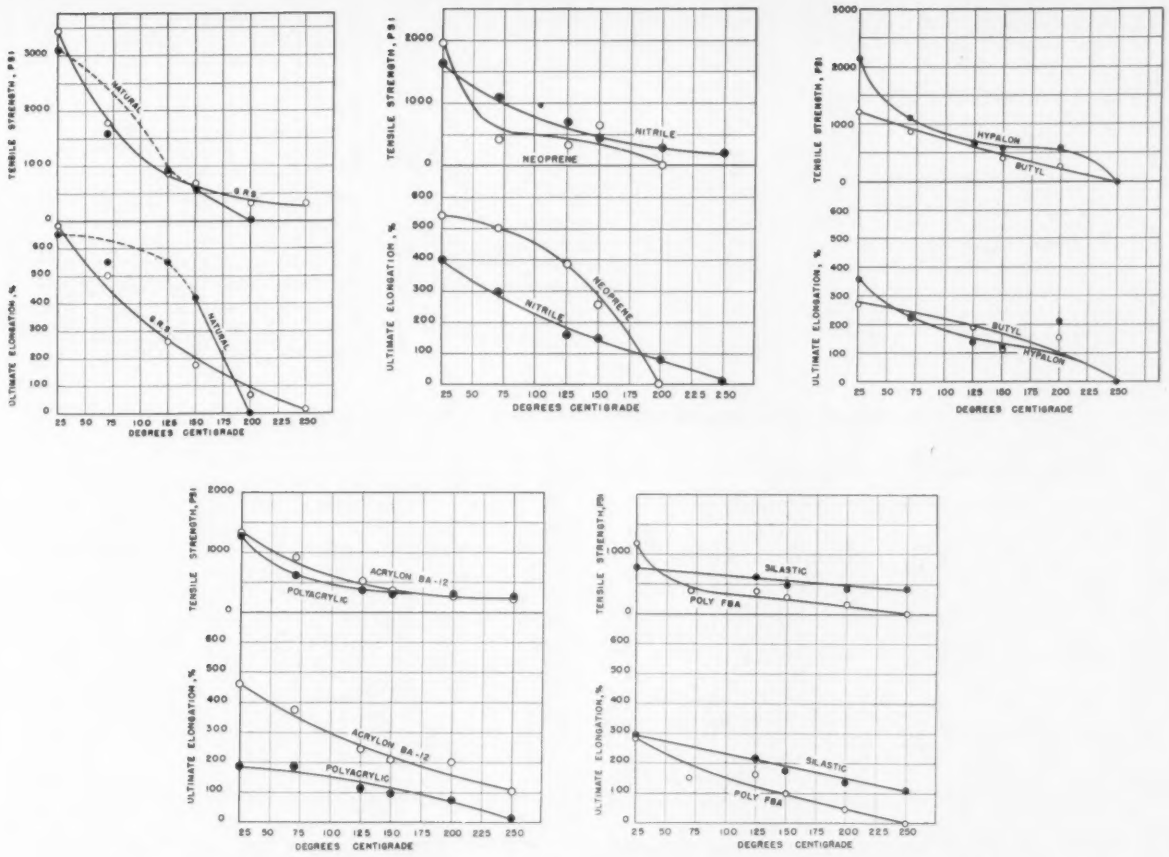

FIG. 1—Effect of temperature on tensile strength and elongation of various polymers.

that temperature, were still higher than those of any of the other rubber samples tested, however, because these compounds had the highest initial strength and elongation. Above 150°C., these properties in the neoprene and natural rubber samples dropped off rapidly to values below those of any of the other compounds tested. The tensile strength and ultimate elongation of GR-S at temperatures above 150°C. were greater than neoprene or natural rubber and about equal to those of the other organic rubbers.

The tensile strength and ultimate elongation of test samples of Butyl, nitrile, Poly FBA, and polyacrylic declined almost linearly with increasing temperature. At 250°C., elongation was 50% or less. It was assumed that with less than 50% elongation the usefulness of any rubber would be seriously limited in most applications.

The tensile strength and elongation of Hypalon dropped off rapidly at temperatures up to 125°C., leveled off and then dropped rapidly again at temperatures above 200°C.

Of all the organic rubbers tested, Acrylon BA-12 showed the best retention of physical properties at temperatures above 150°C. Tensile strength and elongation measured on the silicone rubber samples showed the least change at temperatures up to 250°C., with a definitely linear relation indicated between physical properties and temperature.

The natural rubber samples softened and exhibited plastic flow. At both 70° and 125°C., elongation was greater than 550%, the maximum value measurable with the test equipment used. The tensile values shown for natural rubber in Figure 1 after conditioning for 15 minutes at 70°C. and 125°C., and in Figure 2 after aging at 70°C. are the tensile modulus at 550% elongation rather than tensile at break. These values are shown as a dotted line on the graphs. Values at room temperature were obtained on a Scott L-3 tensile tester.

The balance of the investigation involved conditions more nearly simulating actual high temperature applications. Samples were both aged and tested at various temperatures.

Effects of Heat Aging

Tensile strength and ultimate elongation of the organic rubber samples measured at 70°C. (158°F.) are plotted against exposure time at that temperature in Figure 2. Silicone rubber was not aged at 70°C. because it is normally used at higher temperatures.

TABLE II—TIME NECESSARY FOR TEMPERATURE EQUILIBRIUM AT 150°C.

Time at Temperature	Silicone Rubber	
	Tensile	Elongation
5 Minutes	508	162
15 Minutes	553	170
30 Minutes	502	157

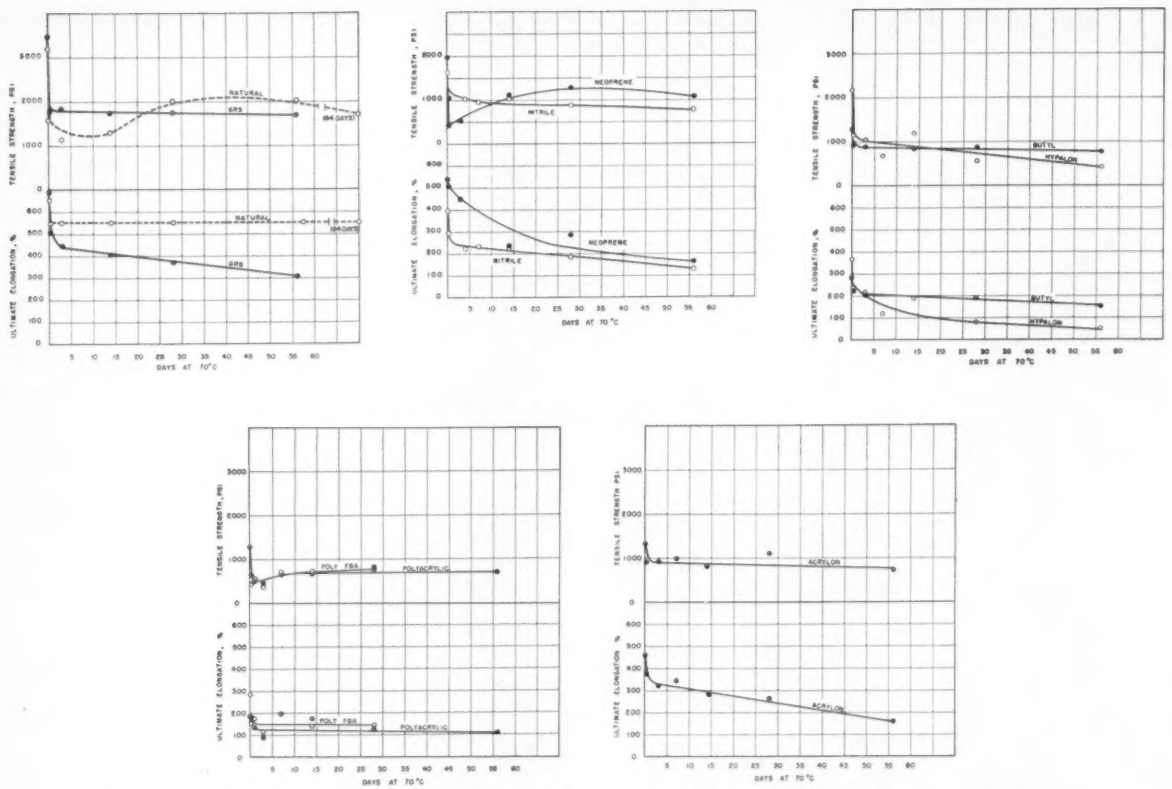

FIG. 2—Effect of aging at 70°C. on the tensile strength and elongation of various polymers.

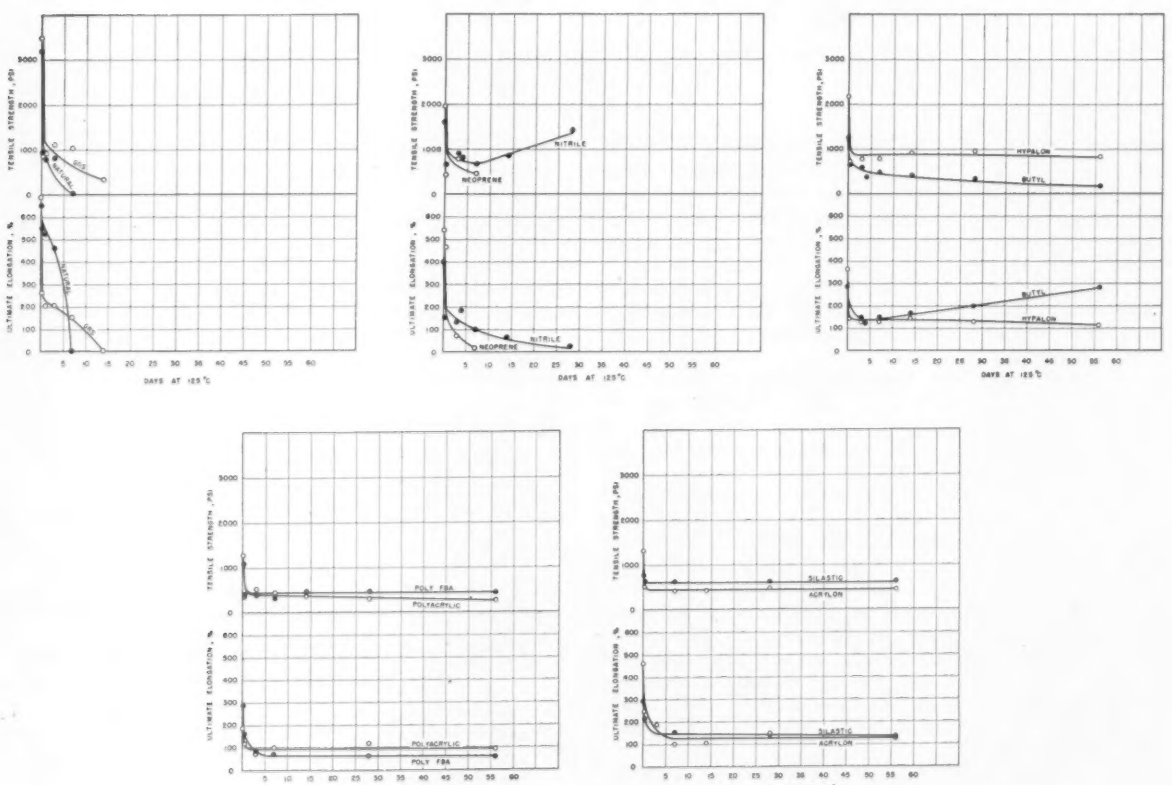

Fig. 3—Effect of aging at 125°C. on the tensile strength and elongation of various polymers.

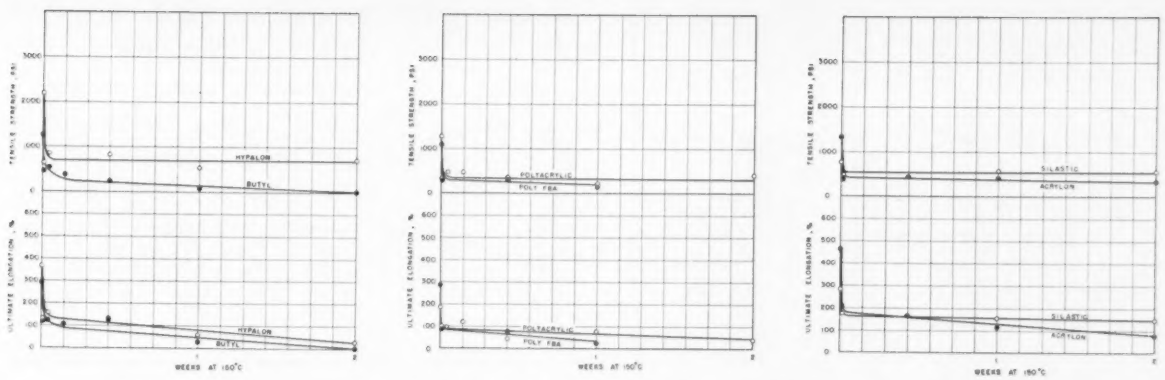

FIG. 4—Effect of aging at 150°C. on the tensile strength and elongation of various polymers.

The tensile modulus of natural rubber at 550% elongation declined gradually to a minimum after about two weeks. It then increased and reached a maximum between four and eight weeks. The elongation of GR-S, neoprene and Acrylon samples dropped off rapidly during the first few days of aging and continued to decline at a lower rate for the rest of the aging period. The elongation of Hypalon fell off during the first two weeks at 70°C. to approximately 100% and then declined more gradually during the next six weeks. Nitrile, Butyl, Poly FBA and polyacrylic showed only slight reduction in properties due to long time aging at 70°C. After the initial loss of tensile strength and elongation, the nitrile, Butyl, Poly FBA and polyacrylic samples showed relatively little change with additional aging for the eight week period at 70°C.

The effect of aging and testing at 125°C. (257°F.) is shown in Figure 3. After one week at 125°C., the natural rubber and neoprene samples had lost all usefulness as elastomers because of an excessive drop in elongation. The elongation of GR-S was practically zero after two weeks.

In the Butyl rubber samples, tensile strength decreased and elongation increased on aging at 125°C., indicating a softening of the rubber. This was also shown by a drop in the durometer from 73 after one week at 125°C. to 50 after eight weeks.

After two weeks, elongation values for the nitrile rubber samples had decreased to 50% and continued to drop with additional aging. Tensile strength decreased during the first week to about 700 psi, and then increased on further aging. This is apparently due to the additional cross-linking of the rubber indicated by an increase in hardness from 59 originally to 94 after four weeks of aging.

The Hypalon, Acrylon, polyacrylic, Poly FBA and silicone rubber samples showed no appreciable change in properties on aging after the initial drop caused by the test temperature.

Hypalon and silicone rubber had the best physical properties after eight weeks at 125°C. Hypalon had a tensile strength of 800 psi and ultimate elongation of 110%. Silicone rubber had a tensile strength of 600 psi and elongation of 130%. Elongation values measured on the Hypalon samples, however, were decreasing somewhat more rapidly than they were in the silicone rubber samples. The tensile strength and elongation values for Hypalon at 125°C. were better than they were at 70°C. No explanation of this change can be offered at this time.

Properties after aging and testing at 150°C. (302°F.) are shown in Figure 4 and Table III. The elongation of natural rubber and neoprene decreased to less than 50% after one day. GR-S and nitrile had less than 50% elongation after three days at 150°C. Elongation values for Hypalon declined to less than 50% after two weeks. Its tensile strength decreased to about 800 psi after eight hours at 150°C. but showed no further change during two weeks of aging.

TABLE III—AGING AT 150°C.

Time at Temperature	Natural T	Natural E	GR-S T	GR-S E	Nitrile T	Nitrile E	Neoprene T	Neoprene E
Room Temp.	3195	650	3480	690	1602	395	1950	540
15 Mins....	590	420	689	177	435	146	635	255
1 Day	Deteriorated		775	156	366	100	104	10
3 Days	——	——	299	26	438	15	Brittle	

After exposure for two weeks at 150°C., elongation values for the polyacrylic samples had decreased to about 40%. Tensile strength decreased to about 450 psi after eight hours at 150°C., but showed little additional change during the two week period. The Butyl samples had only 250 pounds tensile after three days and were completely deteriorated after two weeks. Poly FBA had less than 50% elongation and approximately 200 pounds tensile after one week at 150°C.

Acrylon showed the best retention of properties at 150°C. of any of the organic compounds but is definitely less heat stable than the silicone rubber. After two weeks at 150°C., Acrylon had a tensile strength of 350 psi with 80% elongation. After two weeks at 150°C., the silicone rubber had 550 psi tensile and 140% elongation.

Tensile strength and ultimate elongation for these various types of rubber after aging and testing at 200°C. are given in Table IV and Figure 5. Natural rubber and neoprene deteriorated after 15 minutes at 200°C. GR-S and Butyl had lost all tensile strength and elongation after eight hours of aging. The elongation of the nitrile rubber samples was below 50% after eight hours at 200°C. Elongation values for the polyacrylic rubber samples were below 50% after two days at 200°C. Acrylon was more heat stable at 200°C. than any of the other organic rubbers. After one week at that temperature, however, its tensile strength had fallen to 130 psi and ultimate elongation to 25%.

Silicone rubber after two weeks at 200°C. had a tensile strength of 450 psi and an elongation of 110%. After eight weeks at 200°C. its tensile strength was 410 psi with 75% elongation.

Data given in Table V indicates that all of the organic

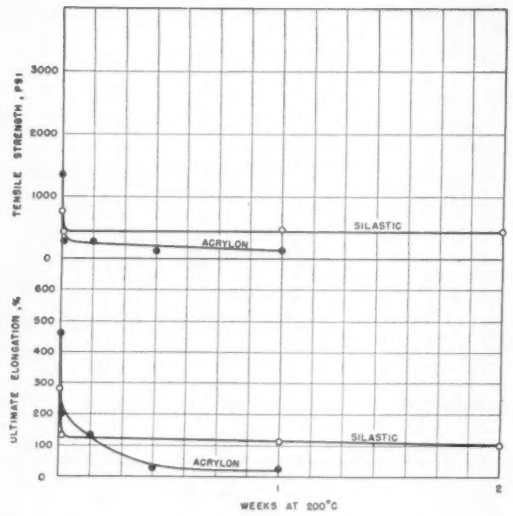

FIG. 5—Effect of aging at 200°C. on the tensile strength and elongation of Acrylon and silicone rubbers.

rubbers tested had lost their rubbery characteristics after four hours at 250°C. Only the Acrylon samples had an elongation of over 50% after 15 minutes exposure.

Data plotted in Figure 6 shows that silicone rubber had a tensile strength of 385 psi and 60% elongation after two weeks at 250°C. On the basis of 50% minimum elongation for satisfactory performance as a rubbery material, the useful life of silicone rubber at 250°C. is over 80 times that of any of the organic rubbers tested.

Discussion

The preceding data show that in evaluating rubber for high temperature use, both aging and testing should be performed at elevated temperatures. The various elastomers tested showed wide differences in the degree to which they were affected by testing at elevated temperatures. Natural rubber, GR-S and neoprene showed rapid loss in strength and elongation when tested at elevated temperatures. Silicone rubber showed the best retention of properties at high temperatures, followed by the acrylic type rubbers, polyacrylic and Acrylon.

After the initial loss of tensile strength and elongation due to the test temperature, further deterioration generally followed the accepted heat stability rating of the various elastomers.

TABLE IV—AGING AT 200°C.

Time at Temperature	Natural T	Natural E	GR-S T	GR-S E	Butyl T	Butyl E	Nitrile T	Nitrile E
Room Temp.	3195	650	3480	690	1289	288	1602	395
15 Mins....	Deteriorated		323	63	260	160	278	75
8 Hours ...	——	——	Brittle		Deteriorated		252	34
1 Day	——	——	——	——	——	——	——	——
2 Days ...	——	——	——	——	——	——	——	——

Time at Temperature	Neoprene T	Neoprene E	Poly FBA T	Poly FBA E	Polyacrylic T	Polyacrylic E	Hypalon T	Hypalon E
Room Temp.	1950	540	1092	286	1280	185	2184	366
15 Mins. ..	Blistered		156	48	314	72	630	125
8 Hours ...	——	——	298	60	285	25	310	50
1 Day	——	——	287	48	268	90	Brittle	
2 Days ...	——	——	——	——	142	25	——	——

Many of the more heat-stable synthetic organic polymers are currently being used satisfactorily in applications in the range of 150°C. (302°F.). In view of the relatively low tensile strength and elongation of these materials measured at 150°C. after brief exposure at that temperature, it can only be inferred that less physical strength is required in such applications than has been generally assumed. For higher temperature applications, properties determined at use temperature after aging at that temperature are much more important than high values for tensile strength and elongation at room temperature.

On aging and testing at 70°C. all the organic rubbers showed only a gradual decrease in properties after the large initial drop due to thermal effects. Natural rubber and GR-S had the best tensile strength and elongation after heat aging at 70°C. All the other elastomers tested appear to maintain enough tensile strength and elongation to assure good serviceability for extended periods at 70°C.

At 125°C., silicone rubber was superior in physical properties to all of the other types of rubber tested with the exception of Hypalon. It was approximately equal in strength and elongation to Hypalon at this temperature. However, the elongation of the Hypalon decreased at a slightly greater rate, indicating that, on further aging, silicone rubber would be superior. This agrees closely with the work of Peter *(6)*, who after an investigation of silicone, neoprene, nitrile and Butyl rubbers involving aging and testing at 125°C., concluded that silicone rubber was superior to the other rubbers at temperatures above 125°C. His investigation included some variation in formulation of the various types of rubber tested.

On the basis of data reported here, it is evident that at 150°C. (302°F.) or above, silicone rubber has greater tensile strength and elongation than any of the organic rubbers tested.

TABLE V—AGING AT 250°C.

Time at Temperature	Natural T	Natural E	Butyl T	Butyl E	Neoprene T	Neoprene E	Poly FBA T	Poly FBA E	Hypalon T	Hypalon E
Room Temp.	3195	650	1289	288	1950	540	1092	286	2184	366
15 Mins.	Deteriorated		Deteriorated		Brittle		Deteriorated		Brittle	

	GR-S T	GR-S E	Nitrile T	Nitrile E	Polyacrylic T	Polyacrylic E	Acrylon T	Acrylon E
Room Temp.	3480	690	1602	395	1280	185	1320	460
15 Mins.	329	16	197	5	253	15	238	103
4 Hours	Brittle		Deteriorated		Deteriorated		123	18

The heat stability of silicone rubber after long exposure at elevated temperatures has been well established. It is generally attributed to the complete saturation of the polymer and the inherent stability of its molecular configuration *(7)*. The superior retention of tensile strength and elongation when tested at high temperatures can be explained partly by polymer stability. It may also be due to the fact that the silicone polymer has significantly lower values for the temperature coefficient for visco-elastic properties than organic polymers. This is characteristic of all forms of dimethyl polysiloxane *(8)*, of which Silastic 401 Gum is an example.

Summary

The testing of rubbers for service at high temperature should include both aging and testing at the temperature of intended use.

All of the types of rubber tested showed significant decline in tensile strength and ultimate elongation as the test temperature was increased. Silicone rubber showed the least change in properties followed by the acrylic type polymers.

Heat aging and testing at the aging temperature showed that all of the formulations tested were serviceable at 70°C. After aging and testing at 125°C., Hypalon and silicone rubber had the best strength and elongation. At 150°C. or above, silicone rubber was definitely superior to the other compounds tested.

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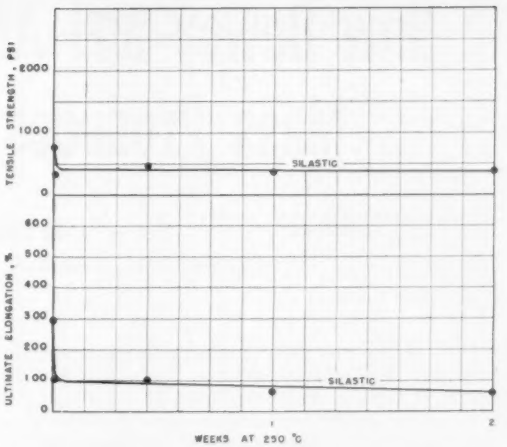

FIG. 6—Effect of aging at 250°C. on the tensile strength and elongation of silicone rubbers.

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(3) Morron, Knapp, Linhorst and Viohl, *India Rubber World*, Vol. 110, p. 521 (1944).
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(5) Boonstra, *India Rubber World*, Vol. 121, p. 299 (1949).
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(8) Hunter, Warrick, Hyde and Currie, *J. Am. Chem. Soc.*, Vol. 68, p. 2284 (1946).

Coming Next Month...

"Some Variables Affecting Modulus of GR-S"—By W.K. Taft, T. B. Harrison, R. W. Laundrie and June Duke, Government Laboratories, University of Akron, Akron, Ohio.

A comprehensive report on a systematic investigation of some of the variables encountered in the manufacture of GR-S type rubber which may affect the 300% modulus of the polymer. Six variables for hot or cold rubber are covered in the report.

"Push Button Foam Rubber"—By Joseph L. Webster

This multi-illustrated description of the new Dunlop factory at Whitby, Ontario, Canada, describes how automation, gravity and ingenious layout combine to produce highest quality, lowest cost latex foam rubber. Includes flow chart of operations.

"Latest Developments in Butyl Rubber"

Report of a symposium held by the Rhode Island Rubber Club. Includes up-to-date data on mechanical goods, wire and cable extrusions, brominated butyl and butyl reclaim. Also an introduction by R. M. Thomas, co-inventor of Butyl rubber. Also questions and answers.

"How Goodyear Gets Better Performance from Its Battery-Powered Industrial Trucks."

A detailed description of how battery-powered industrial trucks are maintained and kept rolling at Goodyear's three Akron plants. Includes a description of the battery charging room and tells how batteries are handled for maximum performance.

Plus several short practical articles.

How Dewey and Almy Chemical Company Mass Produces Weather Balloons

By FRANCIS B. CASEY

Assistant Chief Engineer, Dewey and Almy Chemical Co., Cambridge, Mass.

DRYING of rubber meteorological balloons is synchronized into other mass production operations at Dewey and Almy Chemical Company by use of chemical dehumidification air conditioning equipment. The system has proven to be a simple, effective, yet economical way to achieve the required low humidities in the drying area at low temperatures.

For effective weather forecasting, accurate data on the atmosphere must be gathered to supplement surface observations, sometimes from up to 150,000 feet above the earth. Various types of balloons are presently used for this work, each having different performance characteristics and purposes. Prototypes of all of these were developed by Dewey and Almy in 1935 in cooperation with Harvard University's Blue Hill Observatory.

The smallest of these, ceiling balloons, used to determine the height of the lowest level of clouds, measures only 5 inches in diameter before inflation, 22 inches at burst. They can be produced in excess of 1,250,000 a month.

Pilot balloons, tracked through instruments to show wind directions and velocity at various altitudes, are made in sizes up to 7.5 feet in diameter at burst. Under favorable circumstances they can be tracked up to 66,000 feet. Monthly production can exceed 172,500 per month.

Any free balloon which carries an instrument aloft, plus a parachute to return it safely to earth, is called a sounding balloon (Figure 1). In meteorology, radiotype transmitters are used which automatically and continuously send to receivers data on humidity, temperature, wind velocity and direction. The largest of these, 29 feet in diameter at burst, can be produced in excess of 17,500 a month.

FIG. 1—A sounding balloon being released to the atmosphere. The balloons, which are the mainstays of modern meteorology, carry miniature radio transmitters into the sky to gather weather data.

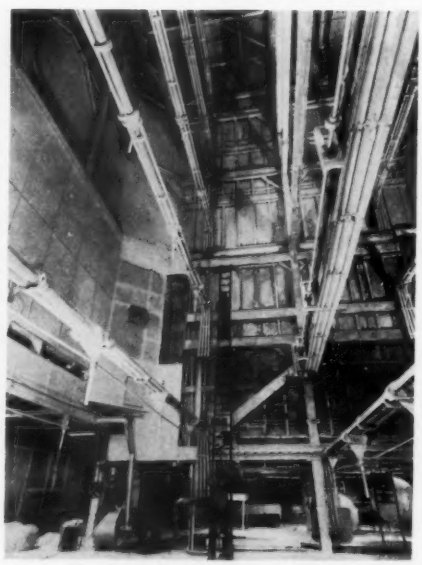

FIG. 2—View of drying tower in which sounding balloons are gel inflated to finished size and dried in a conditioned atmosphere.

New Mass Production Technique

Previous to 1935, to make large rubber products manufacturers used molds as large as the final object. Such a restriction would, if true today, sharply limit the size and quantities of weather balloons available. The finished size of one sounding balloon is 90 inches in diameter before inflation. Thus, a new mass production technique was developed by Dewey and Almy at the same time the prototype balloons were created for the Blue Hill Observatory.

In this new technique, mixtures of latices of rubber, neoprene and other polymers are compounded and fed into latex dip tanks. Fluted molds, one-fourth the finished size, after being dipped into a coagulant solution and dried in ovens, are moved by overhead rails to a position above the latex dip tanks. They are then slowly dipped into the liquid mixture and removed in a carefully timed automatic cycle. Rubber is deposited on the mold as a gel with water dispersed within and around the rubber particles. After the gel is deposited and the molds removed from the tanks, they pass through a leaching process which is also automatically timed and continuous. This allows the latex to set.

The molds then move on the overhead rails to strippers, who take the gels off the molds and inspect them.

After further washing and internal and external dusting the gels are taken to drying towers (Figure 2) where they are positioned on a huge mechanized conveyor, inflated to finished size, dried and deflated. As many as 40 of the largest size balloons may be in process in the tower at one time. Subsequent operations are curing, final inspection and packaging.

Tower Air Conditioning

The moisture, approximately 1½ to 2 pounds per balloon, which is entrapped within and around the rubber particles in the dip tanks plays an important part in the mass production technique. Because of it, the rubber film can be distended from one-quarter size to full size without stretching the film. On inflation, the water acts as a lubricant, enabling the rubber particles to move freely to a new, extended association. When stretched on inflation, the moisture is forced to the surface as beads. To enable the rubber particles to knit in the distended form, this moisture must be removed. Temperatures above 100°F. cannot be employed, as a spotty, precure would result. Such balloons would be rejects after subsequent operations.

Optimum atmospheric conditions for gel inflation and drying are not the same. In the former instance, drying of moisture during inflation is undesirable as the moisture must be retained to act as a lubricant. Thus, two separate zones were established, 70°F., 50% RH in the inflation and conveyor loading area, and approximately 100°F., 20 to 30% RH in the drying area. A Kathabar humidity conditioning unit was chosen as the basis of the air conditioning system. This equipment removes moisture from the air through direct absorption.

As Table I indicates, significant operating economies and a lower first cost are enjoyed with this method, compared with a standard refrigeration system for the same application. First cost in the table includes only the basic equipment required, a package unit in the chemical-type dehumidification system, and a compressor and coils in the refrigeration system. With regard to the maximum operating requirements, the comparison only includes the requirements needed to deliver 5000 cfm of air at 85°F., 40 gr./lb. when entering air conditions are 90°F. and 120 gr./lb.

Thus, with this system, operating savings of over $19.00 per day could be realized, compared to a standard refrigeration system. This operation, although not operating 24 hours per day now, was operated as such during the war years. On that basis the operating savings, taking 40% of maximum as an average figure, would be over $2500.00 yearly.

TABLE I—COMPARISON OF COSTS BETWEEN A CHEMICAL-TYPE DEHUMIDIFIER AND A STANDARD SYSTEM

Maximum Operating Requirements	Chemical-Type Dehumidifier with City Water Coolant	Standard Refrigeration
First Cost	Base (package unit)	+ $5750.00* (compressor & two coils)
(1) Water (17c per 1000 gals.)	$.41 (40.3 gpm)	$.99 (97 gpm for condensing)
(2) Steam ($1.00 per 1000 pounds)	$.64 (642.5 lbs./hr. for regeneration)	$.24 (243 lbs./hr. for reheating)
(3) Electricity ($1.35/hp per hours)	$.02 (1¾ hp)	$.65 (48 hp-48 tons)
Totals	$1.07 per hour	$1.88 per hour

* To obtain the desired low humidity level, refrigeration equipment would have to operate at 30°F. suction temperature, requiring a second set of coils for operation while the first coils were defrosting.

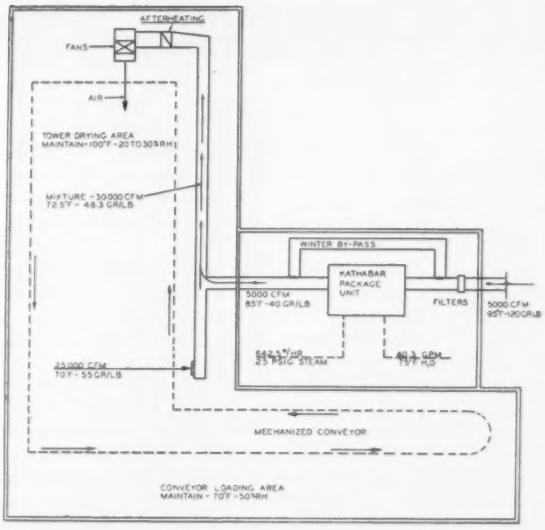

FIG. 3—A cross section of the conveyor loading area and drying tower. The air conditioning equipment is shown schematically together with the air distribution system.

Operation of the System

A cross section of the two air conditioning zones, the air distribution system, and a schematic of the systems operation is shown in Figure 3. The 5000 cfm of outside air is shown being drawn into the system at maximum design conditions of 95°F., 120 grains of moisture per pound. After filtering, the air passes into the air washer or contactor chamber of the Kathabar unit. There it contacts a flood of the absorbent solution employed in this equipment, as both pass over cooling coils. The moisture absorbing capacity of the absorbent solution, lithium chloride, at a set density, is a function of its temperature. The colder the solution is, the more moisture it will absorb. Thus, once the dehumidification requirements are known, a specific temperature coolant and rate of flow will automatically maintain it.

In this installation, maximum design conditions would require 40.3 gpm of the available 75°F. city water. After the dehumidification pass, the air, now at 85°F., 40 gr./lb., is mixed with 25,000 cfm of recirculated air drawn into the system above the conveyor loading area. This mixture, 30,000 cfm at 72.5°F., 48-3 gr./lb., is then heated to about 100°F. and circulated by fans from the top of the drying tower. Air conditions are thus maintained at 100°F., 20 to 30% RH within the tower, depending on the size and number of balloons in process. Conditions in the loading area are maintained at 70°F., 50%RH.

Regeneration of the absorbent solution is also simple and automatic. As it becomes diluted, a small portion of the total solution (about 10%) is pumped from a common sump below the air washer chamber to a regenerator chamber. Operation in this chamber is similar, yet on a smaller scale, to operation in the dehumidi-

fication cycle. The absorbent solution is sprayed over coils as it contacts an air stream. However, in these coils, steam is used instead of a coolant. The steam raises the solution's temperature, causing it to give up the excess moisture to the passing air stream. This moisture-laden air is exhausted to the outside, while the absorbent solution falls back into the sump. At maximum design conditions, the system uses 642.5 lbs./hr. of 25 psig steam for regeneration. Illustrated in Figure 4 is a Kathabar package unit similar to the one installed at Dewey and Almy.

As indicated, the entire system operates automatically. Thermostatic controls regulate the flow of the coolant in the air washer coils. Regeneration is intermittent as needed. The ¾ hp solution pump and a 1 hp motor on the regenerator fan are the only moving parts. There is no cycling or defrosting of coils necessary. The internal latent load on this system is 295,550 Btu/hr. Internal sensible load is 54,000 Btu/hr. to the air mixture points. Regeneration load amounts to 225,700 Btu/hr.

Many other manufacturers of temperature-sensitive products, such as pharmaceuticals, foods, chemicals and plastics, could use a similar system for low temperature drying. It provides a simple, efficient, yet low-cost method of controlling the speed of drying so that this step in the manufacturing process can be synchronized with the particular method of mass production.

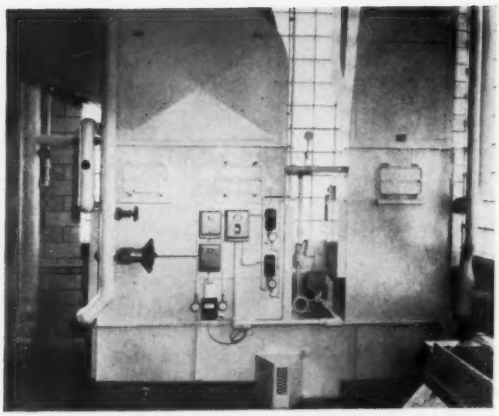

FIG. 4—A Kathabar package unit similar to the one installed at Dewey and Almy to dry the air supplied to the drying tower.

Abrasive Belt Grinding Results in Economies

BY use of abrasive belt grinding for fabric plates, the Akron Equipment Company has achieved a 25 to 1 increased stock removal rate over a costly milling operation. The plates are used to secure tires inside tire molds during the final curing operation. The two parts of the mold, male and female, are clamped together over the uncured tires. The inner plates hold the contour of the encased tires, while the tread and sidewall designs are cured into the rubber.

The curved steel segments used in tire molds known as fabric plates are finished at the Akron Equipment Co. on the Engelberg Model BG-8 belt grinder shown in the photograph above.

Plate design is determined by the type of tire, tube or tubeless, and by the fabric used, such as nylon or rayon. The plates, which are 1½ inches thick and vary in lengths from 3 to 12 inches, are made of No. 1012 steel. For snug, contour fit in the tire molds, the company found that maximum stock removal required is ⅛-inch thick.

The Akron, Ohio firm encountered excessive tooling and considerable downtime with the former milling machine operation. Filing and remilling were often necessary to obtain a satisfactory fit. This combination of adverse factors kept the average finishing rate down to only five pieces per hour during test runs conducted by the concern.

To correct this situation, the company tested other methods, the results of which led to the installation of an Engelberg abrasive belt surfacer, a product of the Engelberg Huller Co., Inc., Syracuse, N. Y. This wet- or dry-belt Engelberg model BG-8 utilizes the platen method of belt grinding. The operator manually surfaces the fabric plates against a straight section of the belt which is supported by a 12 inch x 9 inch hardened steel platen, mounted on an adjustable backing plate. Dry belt used for fast, accurate stock removal is 9 inches wide, aluminum-oxide, 36 grit; standard belt speed is 4100 sfpm, with optional speeds from 2500 to 4600 sfpm.

Unlike the milling machine which is freed for other operations, the Engelberg model BG-8 required no fixtures. Reworking of the plates is unnecessary, and rejects have been eliminated. Net grinding time on each fabric plate was cut from 12 minutes to 25 to 30 seconds, with a corresponding reduction in direct labor costs. And with finishing time reduced to a minimum, the Engelberg abrasive belt machine is available for whatever additional applications are found for it, officials of Akron Equipment state, thus making it additionally valuable to the company.

Stress Relaxation versus Sealability of MIL-R-900 Gasket Materials

By S. A. ELLER

Elastomers Development Section, Material Laboratory, New York Naval Shipyard, New York, N. Y.

ELASTOMER gasket materials are used to prevent leakage of a fluid at the junction of metallic components, such as in ship's hatches and pipe line flanges. To prevent leakage, the gasket material must exert a force against the metallic sealing surfaces that is greater than that of the contained fluid.

It would be an ideal situation if the back force against the metal components exerted by the compressed gasket material were constant with respect to time. Unfortunately, this is not so and the back force decreases with aging, due primarily to rupture of molecular bonds. Stress relaxation is that decrease in back force that occurs under conditions of constant strain; and if the stress relaxation is excessive, the back force may be reduced to such an extent that the gasket fails in service.

The importance of stress relaxation as a significant functional property of elastomeric materials has prompted Tobolsky *(1)*, Blow and Fletcher *(2)*, Thorn *(3)*, Morris *(4)*, and Farnam *(5)*, and numerous other investigators to design apparatus to measure this property. Stress relaxation has also received considerable attention in the research program on rubber materials being conducted under the general guidance of T. A. Werkenthin, Bureau of Ships, Navy Department, Washington, D. C.

The rubber industry has also been concerned with this problem and personnel of the Material Laboratory in cooperation with Subcommittee 17 of Committee D-11 of the ASTM have developed the stress relaxation apparatus described herein. A testing procedure using this apparatus has recently been approved by Subcommittee 17 as a standard method of test.

This investigation was undertaken to determine the relationship between stress relaxation and seal aging properties of elastomer gasket materials.

Compression Stress Relaxation Apparatus

The Material Laboratory compression stress relaxation apparatus *(6)*, a cross-section of which is shown in Figure 1, is essentially the same as that used in conducting compression set tests at constant deformation, described in Method B of ASTM Method D-395, in that the test specimen is compressed between parallel metal plates to the height of inserted metal shims. The part of the top plate assembly that actually compresses the specimen is a load applicator. The load applicator slides with minimum friction relative to the top plate and is insulated electrically from the apparatus except for a flange that is in metal-to-metal contact with the underside of the top plate. An electrical resistance meter is connected to the apparatus to measure the resistance at the metal-to-metal contact of these parts.

The arrangement of the apparatus is such that the back force in the specimen exerts an upward force on the load applicator that is resisted by the top plate. To measure this back force, an external force is applied by means of a testing machine to the load applicator. This external force causes additional compression of the specimen only when it exceeds the back force in the specimen. Additional compression of the specimen, on the order of magnitude of 0.0005 inch, is detected on the resistance meter. The external force required to cause this additional compression of the specimen is taken as the back force exerted by the compressed specimen.

The bottom plate of the apparatus has a base plug equipped with a micrometer arrangement to permit accurate adjustment of the percentage of compression of the specimen.

Test Procedure: The specimen was compressed 20% and the back force was measured 3 minutes after compression. Immediately afterwards, the base plug was turned to decrease the compression of the specimen by successive increments of 0.010 inch and after a 3 minute waiting period at each increment the back force was again measured. This operation was continued until the back force was zero. The specimen was then removed from the apparatus and allowed to recover for at least one day (at room temperature).

Following this, the specimen was again compressed 20% and the back force determined 3 minutes after compression. The assembled jig was allowed to rest for one hour at room temperature, then placed in a Geer oven and aged at 158±2°F. for 46±½ hours. After aging, the assembled jig was permitted to cool for 5 hours, and then the back force was again measured.

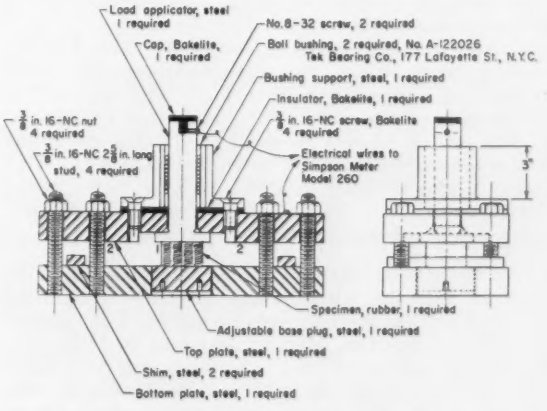

FIG. 1—Cross-section of the Material Laboratory compression stress relaxation apparatus.

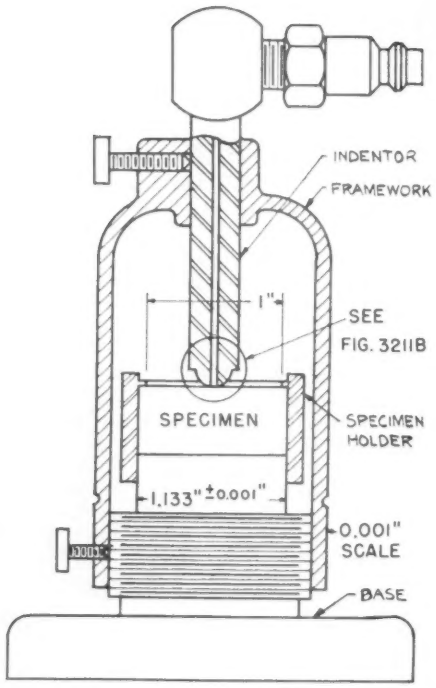

FIG. 2—Seal aging apparatus.

Immediately afterwards, the decrease in back force of the specimen with decrease in compression was determined at successive increments of 0.010 inch as described above.

Seal Aging Apparatus

The seal aging apparatus, shown in Figure 2, consists essentially of a base, specimen holder, framework and an indentor drilled lengthwise, terminating in an orifice 0.040 inch in diameter. The base has a threaded fitting and a flat projection. The specimen is placed on the flat projection and is held in place by the holder. The holder is a thin-walled cylinder with a rim to contain water used as an aid in detecting air leakage from the indentor.

The hemispherical end of the indentor is embedded in the specimen and the other end of the indentor is connected to a supply of high pressure air. The indentor is held in place by the framework that is threaded onto the base and is equipped with a micrometer device. The arrangement of the apparatus is such that rotation of the framework relative to the base results in motion of the indentor toward or from the specimen. This motion can be adjusted to 0.0005 inch by means of the micrometer device. There are relatively few requirements calling for such minute measurement.

Test Procedure: The test specimen was placed in the apparatus and the initial sealing pressure determined at an indentation of 1/16 inch as described in Method 3211 of Federal Test Method Standard No. 601 *(7)*. Immediately afterwards, the indentation was reduced by successive increments of 0.010 inch and after a three minute waiting period at each increment the sealing pressure was measured. This operation was continued until the pressure was zero. The specimen was then removed from the apparatus and allowed to recover for at least one day.

The specimen was then turned over, replaced in the apparatus and the initial sealing pressure again determined at 1/16 inch indentation. The assembled jig was allowed to rest for one hour and then aged in a Geer oven at 158±2°F. for 46±½ hours. After aging, the assembled apparatus was allowed to cool for three hours and the sealing pressure of the aged specimen was measured. Immediately afterward, the decrease in sealing pressure with decrease in indentation was determined at successive increments of 0.010 inch as described above.

Synthetic Rubber Gasket Materials

The gasket materials used in this investigation consisted of Buna-S stocks, S-3-11 and E-162-1488, compounded to meet the requirements for class 2 material of Specification MIL-R-900. In addition, Neoprene W stock E-156-575 and Buna-N stock E-194-542, compounded to meet the requirements for class 1 and class 5 material, respectively, of Specification JAN-R-1149, were included in this study. One slab measuring 12 inches square by ½-inch thick of each of these gasket materials was prepared using the compounding ingredients and cure conditions given in the U. S. Navy Rubber Formulary.

The tensile strength and elongation properties of the gasket materials, in the initial condition and after aging for 46 hours at 158±2°F., are given in Table I. Randomly selected test specimens, 1.129±0.010 inch in diameter and ½-inch thick, were tested in triplicate using the stress relaxation and seal aging apparatus.

CALCULATIONS

Stress relaxation,

$$\% = \frac{S_I - S_F}{S_I} \times 100,$$

where S_I = Back stress in the specimen before aging, psi at 20% compression 3 minutes after assembly.

S_F = Back stress in specimen after aging, psi at 20% compression.

Seal relaxation,

$$\% = \frac{P_I - P_F}{P_I} \times 100,$$

where P_I = Seal pressure of the specimen before aging, psi at 1/16 inch indentation.

P_F = Seal pressure of the specimen after aging, psi at 1/16 inch indentation.

TABLE I—TENSILE STRENGTH AND ELONGATION OF THE GASKET MATERIALS

		Tens. Str. (psi)		Elongation (%)	
Stock No.	Elastomer	Initial	After Aging	Initial	After Aging
S-3-11	Buna-S	1660	1530	520	470
E-162-1488	Buna-S	1560	1600	450	430
E-156-575	Neoprene W	1360	1400	860	870
E-194-542	Buna-N	1300	1500	830	810

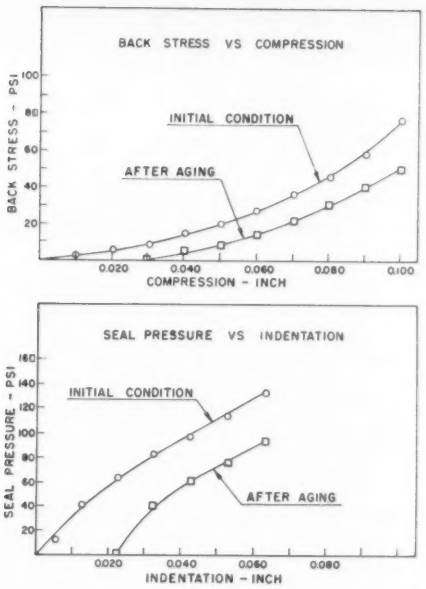

FIG. 3—Decrease in back stress and seal pressure of Buna-S stock S-3-11.

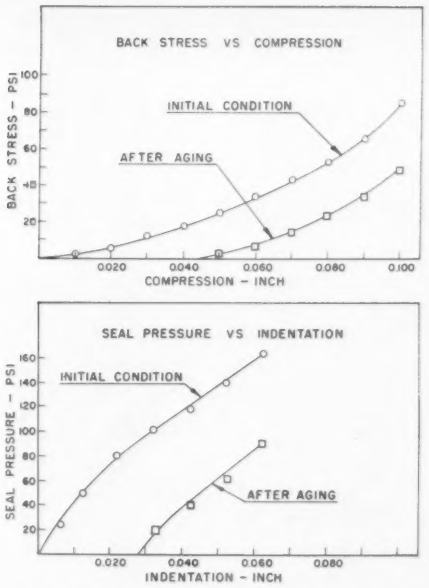

FIG. 5—Decrease in back stress and seal pressure of Neoprene W stock E-156-575.

Results

The decrease in back stress and seal pressure with decrease in indentation of initial condition and aged specimens of Buna-S stock S-3-11, Buna-S stock E-162-1488, Neoprene W stock E-156-575 and Buna N stock E-194-542 are shown graphically on Figures 3, 4, 5 and 6, respectively. Analysis of these figures indicates:

(a) The back stress and seal pressure characteristics of the gasket materials are adversely affected by heat aging. Not only are the maximum values of back stress and seal pressure reduced by aging, but of greater note, no sealing after aging occurs at indentations less than 0.020 inch.

(b) The curves of decrease in back stress and seal pressure of the heat aged specimens are lower, but essentially parallel to the respective curves for the unaged specimens. This indicates that aging had apparently caused rupture of some of the molecular bonds in the specimens.

(c) At any given strain, the values of seal pressure (in psi) are much greater than the values of back stress.

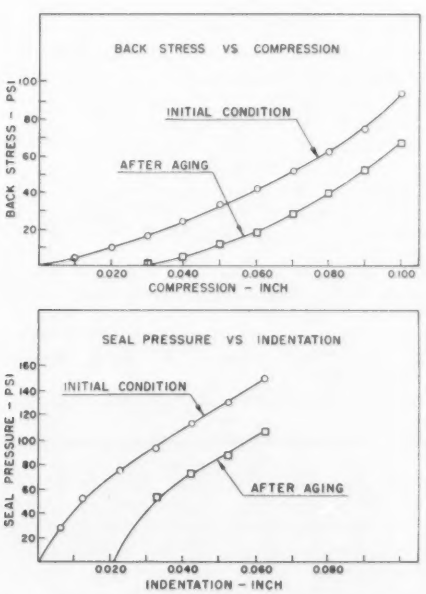

FIG. 4—Decrease in back stress and seal pressure of Buna-S stock E-162-1488.

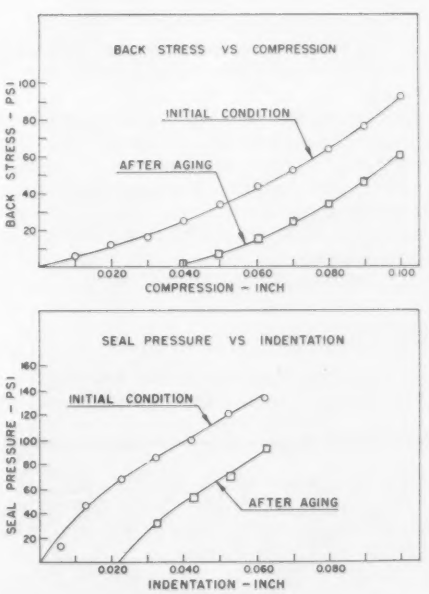

FIG. 6—Decrease in back stress and seal pressure of Buna-N stock E-194-542.

TABLE II—RESULTS OF STRESS AND SEAL RELAXATION TESTS

Stock No.	Elastomer	Specimen Number	S_I (psi)	S_F (psi)	Stress Relaxation (%)	P_I (psi)	P_F (psi)	Seal Relaxation (%)
S-3-11	Buna-S	1	73.2	47.0	35.8	134	95	29.1
		2	69.6	51.0	26.7	131	93	28.9
		3	85.5	57.0	33.4	136	98	27.9
		Avg.			32.0			28.6
E-162-1488	Buna-S	1	97.5	69.2	29.0	142	96	32.4
		2	97.0	66.0	32.0	141	106	24.8
		3	94.5	58.8	37.8	151	108	28.5
		Avg.			32.9			28.6
E-156-575	Neoprene W	1	75.0	40.5	46.0	155	78	49.6
		2	92.7	52.5	43.4	152	98	35.5
		3	93.0	52.0	44.2	158	101	36.1
		Avg.			44.5			40.4
E-194-542	Buna-N	1	90.5	60.4	33.3	133	86	35.3
		2	90.0	57.4	36.2	136	110	19.1
		3	83.5	57.2	31.5	128	92	28.1
		Avg.			33.7			27.5

This is due to the fact that in the seal aging apparatus, elastomeric material protrudes into the orifice of the indentor. To cause air leakage, it is first necessary for the air to expel this protrusion and then to seep past the interface between the elastomeric material and the outer hemispherical surface of the indentor. In contrast with this, the back stress measured by the stress relaxation apparatus is the force exerted by the entire cross-sectional area of the specimen.

(d) The area under the back stress versus compression curve may provide a reliable index of the sealing ability of gasket materials.

The results of stress and seal relaxation tests obtained on each specimen are tabulated in Table II. Analysis of this data indicates:

(a) The percent stress relaxation of the samples are about 4 percent greater than the comparable percent seal relaxation.

(b) The neoprene samples tested had the greatest stress and seal relaxation, whereas there was comparatively little difference between the Buna-S and Buna-N samples.

(c) In general, the percent deviation in results was less for stress relaxation than for seal relaxation. Some reasons for this are that the stress relaxation apparatus measures only this property of gasket materials whereas the seal aging apparatus measures surface tension and penetration resistance in addition to stress relaxation. Also, the seal aging apparatus is more dependent on the surface condition of the specimens.

Conclusions

The stress relaxation apparatus described herein is a suitable tool for investigating this functional property of gasket materials. As such it may be used to determine conformity of gasket materials with specification requirements and to develop new gasket materials with superior stress relaxation characteristics. In this regard, the stress relaxation apparatus will be used to determine the sealability of O-ring gaskets used in diesel engines.

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The Use of Accelerators in the Vulcanization of Rubber

Report of a Symposium Sponsored by the Akron Rubber Group

THE Akron Rubber Group, at its Spring Meeting, held April 6, 1956 in Akron, Ohio, featured a Symposium on "The Use of Accelerators in the Vulcanization of Rubber." Dr. Maurice Morton, Director of Rubber Research, University of Akron, was moderator for the panel discussion and the panelists included the following: A. R. Davis (American Cyanamid), B. S. Garvey, Jr. (Sharples Chemicals), R. R. Waterman (Vanderbilt), A. M. Neal (DuPont), and D. E. Baker (Monsanto Chemical).

In his introductory remarks, Dr. Morton stated that it was appropriate that the symposium be held in Akron, since it was this city which witnessed the discovery and use of the first accelerators at the turn of the century. He went on to say that the development of these chemicals from that time to their present production, which is measured in thousands of tons, represents one of the most interesting developments in industrial chemistry.

There are somewhere in the neighborhood of a hundred accelerators being produced and marketed in this country today. They are not all different, he continued, and generally fall within four or five well known main categories. However, a closer inspection of the consumption of these chemicals reveals some very interesting facts about their use.

It can be seen (see table) that the thiazoles and their disulfides account for more than two-thirds of the total consumption of all accelerators. If to this is added the fact that the organic base types (aldehydeamine and guanidine) are used largely as secondary accelerators to activate the thiazoles, then it appears that the thiazoles indeed dominate the whole field.

Even the ultra-accelerators (dithiocarbamates, thiurams, etc.) are largely used as activators to provide a fast initial cure in a thiazole-accelerated compound. Hence, it can be said that modern rubber vulcanization is based on activated thiazole acceleration. This is somewhat surprising, according to Dr. Morton, since the thiazoles have been known and used since the mid-twenties, and have apparently grown in use continuously, without being displaced by a superior product. In view of the wide variety of chemical compounds which have been investigated for this application, the only conclusion that can be drawn is that the thiazoles must have the best combination of properties as accelerators, together with the modifications that can be introduced by the addition of activators.

The moderator pointed out that an interesting sidelight on the importance of thiazoles is shown by their history. Thus, mercaptobenzothiazole represents one of the few practical discoveries to emanate from a basic scientific investigation. It was the desire of Bedford and Sebrell in Akron, and Bruni in Italy, in 1921, to throw some light on the mechanism of acceleration by such early substances as carbanilide and thiocarbanilide which actually led to this discovery. By isolating MBT as an intermediate in the reaction between thiocarbanilide and sulfur, they were able to prove its remarkable activity. This, he continued, is an excellent example of the fact that pure research is not always useless.

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1953 PRODUCTION OF ORGANIC ACCELERATORS

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Type	*Pounds*
Butyraldehyde-aniline	374,000
Guanidines	6,167,000
Thiazole Derivatives	
Benzothiazyl disulfide	14,860,000
Mercaptobenzothiazole	15,915,000
Other thiazoles	21,994,000
Other cyclic accelerators	1,703,000
Total Cyclic Accelerators	61,013,000

Acyclic

Dithiocarbamic Acid Derivatives	
Zinc dibutyldithiocarbamate	766,000
Zinc diethyldithiocarbamate	1,278,000
Potassium dimethyldithiocarbamate	145,000
Other carbamates	4,084,000
Tetramethylthiuram Sulfides	
Tetramethylthiuram disulfide	4,719,000
Tetramethylthiuram monosulfide	747,000
Other acyclic accelerators	4,420,000
Total Acyclic Accelerators	16,159,000
TOTAL ACCELERATORS	77,172,000

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Compounding Characteristics of Accelerators

By B. S. GARVEY, Jr.

Sharples Chemicals Division, Pennsylvania Salt Manufacturing Co., Devon, Penna.

THE use of accelerators is as old as the knowledge of vulcanization. In some of his earliest compounds, Charles Goodyear used inorganic accelerators such as litharge and white lead. However, it was not until after 1910 that George Oenslager started using organic accelerators in this country. Independently, the Germans developed accelerators in connection with work on synthetic rubber.

Since then, many organic compounds have been tried. A little over fifty are still on the market. Practically all of them fall into five chemical groups: (1) Aldehyde amines, (2) Guanidines, (3) Dithiocarbamates, (4) Thiurams, (5) Thiazoles. Of these, the thiazoles are used in by far the greatest volume.

In this discussion, accelerators will be discussed on the basis of compounding theory rather than on the basis of chemical theory. First, we must note that the curing characteristics of a compound are those of the compound as a whole rather than those of a single component. When we are talking about compounds vulcanized with sulfur in the presence of organic accelerators, as I am, the two components which have a predominant influence on curing characteristics are the rubber and the accelerator. Other components, such as softeners and pigments, have a lesser but sometimes significant effect. The accelerator-sulfur ratio may be important. Accelerators can be classified and compared in a single rubber. The effects of compounding do not materially affect the general comparison, though they are important to the details of specific cases.

For the classification and selection of accelerators the chart shown in Figure 1 may be of value to the rubber compounder. The curve shown in the chart is a typical time-tensile cure curve. Since tensile strength measurements are not very significant at very low cures, the left hand part of the curve is supplemented by a typical Mooney scorch curve. The straight line formalizes the curve for this discussion.

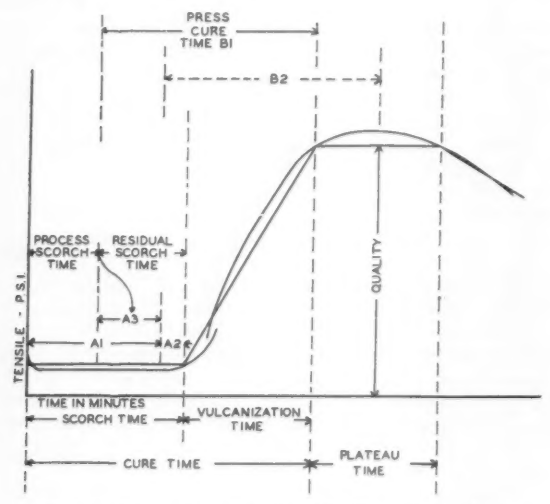

FIG. 1—Chart for the classification and selection of accelerators.

Underneath and to the right are five of the essential characteristics which depend on the accelerator. To these should be added temperature coefficients. The scorch time is the period of delayed action before the vulcanization starts. It is characteristic of the compound, and hence of the accelerator, but will be different for different batches of the same compound, depending on their heat history.

The vulcanization time is the time from scorch to full cure or a technical cure. It seems to be a characteristic constant for the compound. The sum of these two is the cure time. It will vary from batch to batch with the scorch time.

The plateau time is the time over which good physical properties are maintained. It is a rough measure of the stability of the cure and the aging characteristics of the compound. Compound quality in this case is measured by tensile strength. In use, of course, the compound quality is a combination of a number of such properties.

Since processing is usually done over a range of temperatures, mostly below the curing temperature, temperature coefficients are important as the relation between the times at different temperatures.

In selecting an accelerator, the first consideration is the scorch time; otherwise, the product can not be made. The process scorch time must be adequate to cover the maximum heat history which will be applied to a significant number of batches. This is shown as A1 on the chart. In addition, there must be a minimum residual scorch time, A2, for mold flow, knitting, etc. Inadequate scorch time will result in scrap stock and defective parts. Excessive scorch time will lengthen cures unnecessarily and reduce production. The line A3 represents the variation in residual scorch time due to the unavoidable batch to batch variations in the heat history of processing.

The vulcanization time, theoretically, should be as short as possible. Practically, it is limited by heat transfer in thick sections and by the combinations of scorch time, plateau time, and quality which can be obtained with a very short vulcanization time. The longer the plateau time the better. It must be at least long enough to cover normal variations in cure from piece to piece and various parts of the same piece. As a measure of stability it should be long enough to indicate adequate aging.

Compound qualities must be chosen to give the desired characteristics to the end product. When these accelerator or compound characteristics are established the press cure time must be set. This must cover the maximum residual scorch time, A2 plus A3, and the vulcanization time. The press cure time is shown by the solid line at the top, B1. Once established, this time is constant. Since the residual scorch time may vary by the time A3, the position of the press cure in relation to the total cure curve will vary between the positions of the solid line B1 and the dotted line B2. Thus, the pieces will come out of the cure at different parts of the cure curve with corresponding differences in state of cure. The plateau time should accommodate these differences as well as the heat transfer and aging.

Accelerators for Molded Mechanical Goods and Footwear

By D. E. BAKER

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THE category "mechanicals" in rubber covers a vast field. Usually we consider mechanical rubber as being divided into two classes, namely, molded and extruded. This paper will deal only with the molded class. However, many molded mechanicals are first extruded to afford both economical handling and rough pre-forming for molding.

Molded mechanicals may be further divided into the following groups: (1) Stocks for general purpose use, (2) Stocks for specification use including government and armed forces, (3) Stocks for specialties and drug sundries, and (4) Stocks for automotive use. When we consider such a grouping it can readily be seen that the classification "molded mechanicals" will and does require all the curing systems of the other categories plus other curing systems that may be necessary, depending upon the end use of the product.

Requirements for Different Groups

Stocks for General Purpose Use: As the name implies this group does not have very many specific requirements. Usually, the hardness of the finished product is perhaps the most important, and beyond that about the only requirement is that the stock does not disintegrate during service.

Compounds of this type are usually accelerated with the most economical types of accelerator. Of course, this will depend upon the basic polymer used in the compound. When the basic polymer is natural rubber, either new or reclaimed, you may use one of the guanidines, mercaptobenzothiazoles or thiurams. A combination of any two of these type accelerators can also be used to advantage in many cases.

If the basic polymer is GR-S then the guanidines are almost sure to be the secondary accelerator since the mercaptobenzothiazole or thiuram types of accelerator are more efficient in GR-S. Here again the combination type of acceleration plays a very important role in the vulcanization of GR-S stocks and we may find combinations of two or three or more different types of accelerators.

Stocks for Specification Use: This group is usually of somewhat higher quality than the first group and in many cases is of the highest quality. It will in many cases require accelerating systems to provide maximum heat resistance and compression set as well as aging and flex life.

If an extremely good heat resistance is required it will be advantageous to use a very low elemental sulfur ratio and tetramethylthiuram disulfide or no elemental sulfur but a higher dosage of tetramethylthiuram disulfide. Many compounders think that a combination of tetramethylthiuram disulfide and N-cyclohexyl-2-benzothiazole sulfenamide give superior heat resistance and aging to that obtained with the use of only the thiuram. Excellent compression set data can also be obtained with any of these curing systems. It is almost universally true that a compound which is accelerated with tetramethylthiuram disulfide in excess of about 0.75% will bloom.

If extremely good heat resistance is not a prime requisite then one of the mercaptobenzothiazole type accelerators may be used along with elemental sulfur. In many cases a secondary accelerator, or kicker, is used with the MBT type accelerator to provide a better cure and physical properties to a compound than would be obtained without the secondary accelerator. For instance, a small amount of one of the thiurams with any of the MBT type accelerators will give a definite improvement in compression set over that obtained with only the MBT type accelerator. The carbamates can also be used as secondary accelerators with the MBT type accelerators with approximately the same results.

The ratio of MBT type accelerator to thiuram or carbamate is usually within the limits of 9 to 1 or 8 to 2; however, in some instances ratios outside these limits may be desirable. These accelerations are applicable to natural rubber, GR-S and nitrile type rubbers. Combinations of an MBT type accelerator and a guanidine may be used and the ratio of MBT to guanidine will vary over a rather large range depending on the polymer, compounding ingredients and MBT type accelerator used.

Stocks for Specialties and Drug Sundries: This covers a group of compounds that would not normally be included in the other groups given here. This group consists of compounds that are primarily non-black. They are usually white or colored and as such must use accelerator systems that are capable of producing non-discoloring vulcanizates. There is also the problem of odor and taste in some of these compounds, as well as toxicity. The better accelerators for color are the MBT, thiuram and carbamate types.

Problem of Odor and Taste

The problem of odor and taste is an important one in some types of stock depending on their end use. The basic compound must be such that there is a minimum of odor and/or taste and then the acceleration system has to be one that will provide the most freedom from odor and/or taste. Actually, there is no such thing as an odorless and tasteless piece of rubber. This statement is made simply because if a test is conducted among a sufficient number of people there will be a certain number that will definitely object to either or both odor and taste. Rubber may be reodorized by the use of one of the many reodorants available but there is no method of completely deodorizing cured rubber.

The guanidines such as DPG and DOTG are fairly good from an odor standpoint but both tend to produce a bitter taste. Tetramethylthiuram monosulfide is reasonably good on odor and taste. It usually imparts a slightly sweet taste and odor to a vulcanizate. Tetramethylthiuram disulfide and the carbamates tend to give an odor in most cases and usually impart some taste. Mercaptobenzothiazole may prove fairly good for odor and taste in some cases and not in others.

It remains true that each individual compound has to be tested with the different accelerators mentioned if a reasonably good performance is to be attained as to odor and taste.

Toxicity is important in many types of drug sundry stocks and care must be taken in such stocks to use an accelerator or accelerators that do not cause derma-

titis or have other ill effects depending upon the use of the stock. Actually, there are no present day curing systems that are not toxic to some extent under certain conditions and, furthermore, there is always a certain percentage of people that are allergic to things that are not commonly known as toxic.

Stocks for Automotive use: This last group covers compounds for a large number of uses and conditions. The accelerators used include all those that would normally be used in the previous groups. In addition to providing good aging, compression set, and other physicals, many of these compounds must not stain finishes either in contact or by migration. This problem is further complicated by the fact that what will stain one type of finish may not stain another and vice versa. However, it is usually true that one of the MBT, thiuram or carbamate type accelerators will be found fairly satisfactory, but it is almost impossible to tell whether they are suitable without an actual test on the finish in question.

Belting compounds present problems that may approach those of the tire compounder or they may be similar to other high quality molded goods; therefore, the accelerator and curing system will follow along the lines of these types of compounds.

Footwear compounds are usually fairly well uniform in their acceleration. The largest single accelerator is probably MBTS which in turn is combined with either a guanidine such as DPG or DOTG or one of the thiurams or carbamates. These combinations pretty well cover the dry heat curing of rubber footwear. A rather standard ratio for natural rubber is 60/40 MBTS-guanidine or 90/10 MBTS-thiuram or carbamate when dry heat cures are desired.

Accelerators for Latex Compounds and Foams

By R. R. WATERMAN

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THE power needed to mix a latex compound is trivial compared to the power required for Banbury or open mill mixing of dry rubber. Since the power consumption is low, mill scorch does not hamper the latex compounder in choosing a suitable curing system. Consequently, ultra accelerators are used almost exclusively in latex.

An accelerator suitable for latex may be a liquid or a powder, soluble or insoluble in water. However, upon addition to the stabilized latex, it must not cause flocculation or destabilization. Insoluble powders are dispersed and immiscible liquids are emulsified before use. The efficiency of water-soluble accelerators should not be impaired by leaching before cure.

Totally precured (prevulcanized) latex can be used for the production of thin walled dipped articles and fabric coating. There is no counterpart to this in dry rubber.

The end use of an article generally influences its components. Most latex products are used in a personal way. In other words, latex articles are used either in direct contact or in close proximity to one's person. A few examples are foam pillows and mattresses, gloves, toy balloons, the thread in surgical stockings and girdles, and non-woven fabrics for interlining. For uses such as these, the cured article must be non-toxic, odorless (if possible), non-discoloring when in contact with body oils, and light colored for aesthetic reasons. These many requirements have been satisfied by the compounder using relatively few curing systems.

The curing system in foam rubber compounds, both natural rubber and natural rubber-butadiene-styrene blends when open steam cured at 210°F., contains 2 to 2¼ parts of sulfur, 3 to 5 parts zinc oxide, and 2 parts of an accelerator combination. Zinc mercaptobenzothiazole and zinc diethyl dithiocarbamate are the accelerators most widely used. The exact amount of each varies, but the total is generally two parts. Frequently, a guanidine or aldehyde amine accelerator is present but its prime function is to act as a secondary gelling agent.

Foam which is to be dry heat cured will contain an activated dithiocarbamate, sodium salt of a dithiocarbamate, or a partially water-soluble dithiocarbamate in addition to the acceleration used for open steam curing. Foam is almost unique in that to facilitate heat transfer and minimize degradation, it is cured before it is dried. The more normal procedure is to dry first and then cure in order to minimize porosity.

Films suitable for toy balloons require a low modulus, high elongation, and considerable transparency. A typical formulation would be 0.25 to 0.50 parts zinc oxide, 0.75 parts sulfur, and a dithiocarbamate or an activated dithiocarbamate. High modulus films required for certain drug sundry applications would contain 2 parts zinc oxide, 1 part sulfur, and 0.25 to 0.50 parts activated dithiocarbamate.

A typical neoprene meteorological balloon compound would contain 5 parts zinc oxide, 1 part sulfur, and an accelerator system containing one or more of the following: thiuram, guanidine, dithiocarbamate, and activated dithiocarbamate.

A neoprene rug backing compound will contain up to 25 parts of zinc oxide. The main reason for this is to have the zinc oxide act as an acid acceptor and insure long life to the rug fibers. The balance of the curing system would be essentially the same as the meteorological balloons.

Natural rubber-GR-S blends used for rug backing usually contain 5 parts zinc oxide, 1 to 2 parts sulfur, zinc mercaptobenzothiazole and activated dithiocarbamate. In GR-S, the thiazoles produce higher elongations than the dithiocarbamates. However, the thiazoles require high curing temperatures (260°F.).

Nitrile latices are cured using a thiazole-dithiocarbamate combination, 1 to 3 parts zinc oxide and 1 to 2 parts of sulfur. The carboxylic nitriles will develop high tensiles when using zinc oxide as the sole vulcanizing agent. The use of a thiazole-dithiocarbamate combination will improve the cured properties.

To summarize, latex cures are effected at lower temperatures and with lower amounts of sulfur and activator than dry rubber. This more efficient use of curatives is due to more thorough dispersion in the compound and an absence of degradation during mixing.

Curing systems envisioned for the future include a triggered curing system suitable for the 2000 feet per minute of the paper industry so that non-woven fabrics could be made on paper machines. Another is one that would quadruple present tear strength. Still another would be one that would permit filler reinforcement.

Accelerators for Tires and Tubes

By A. R. DAVIS

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SINCE about 1943, the accelerator-curing system practice for tires and tubes has been influenced by the following important factors: availability of synthetic rubber, availability of reinforcing furnace blacks since 1947, and rapid production methods. The present day accelerator-curing system choice is predicated on the use of three types of elastomers: natural rubber, butadiene-styrene copolymers (GR-S), and isobutylene-isoprene copolymers (Butyl rubber).

It is, of course, well known that the synthetic rubbers have different curing characteristics than natural rubber (GR-S cures slower than natural rubber while Butyl rubber cures slower than GR-S), so that the accelerator-curing system practice for tires and tubes is now more complicated than that followed prior to World War II. This practice is further complicated by the fact that the reinforcing furnace blacks have a basic pH and activate the accelerator-curing system while channel black with its acidic pH has a retarding effect.

The increasing use of reinforcing furnace blacks in tire compounds and rapid production methods have required accelerators with more delayed action than those in use prior to 1947 in order to avoid the problems involved with scorching or premature vulcanization of the stocks during processing. These requirements have been responsible for the introduction of several new accelerators in the last five years.

Major Accelerators by Type

The chemicals discussed below are the most important accelerators now in use for the manufacture of tires and tubes.

(1) *Diphenylguanidine (DPG):* DPG is basic in chemical nature and strongly activates the thiazole type of accelerators. In tires, DPG is generally used as a secondary accelerator with the thiazoles particularly in GR-S stocks. A GR-S-ISAF black tread stock with 2.0% sulfur and 0.9 to 1.25% of a benzothiazole sulfenamide may use 0.2 to 0.4% DPG.

(2) *Mercaptobenzothiazole (MBT, Captax, and Thiotax):* MBT is an acidic chemical and is strongly activated by bases. It is very active above 230°F. and has little or no delayed action so that it cannot be used safely in most furnace black stocks. It is sometimes used in channel black stocks alone or with MBTS and is used as a secondary accelerator in Butyl rubber tube stocks. A natural rubber-channel black tread stock with 3.0% sulfur, 0.5 to 0.6% MBT plus 0.5 to 0.6% MBTS for safer processing than straight MBT is a typical example.

(3) *Benzothiazyldisulfide (MBTS, Altax and Thiofide):* MBTS is strongly activated by basic materials. It is very active above 280°F. and although it shows more delayed action than MBT, it cannot be used safely in many reinforcing furnace black stocks. However, it finds use in some carcass, tread and natural rubber tube stocks. A natural rubber-GR-S reclaim carcass stock with about 2.75% sulfur, 0.7 to 0.8% MBTS plus about 0.25% DPG or a small amount of a thiuram sulfide is typical. Natural rubber truck tube stock with 1.0 to 1.5% sulfur may use 0.8% MBTS plus 0.2% of a thiuram disulfide.

(4) *N-Cyclohexylbenzothiazole-2-sulfenamide (Santocure):* Santocure is a thiazole type accelerator with good delayed action which is activated by basic materials. It can be used with reinforcing furnace blacks in both natural rubber and GR-S. However, in natural rubber stocks it is often used with N-nitrosodiphenylamine (Vultrol or Retarder-J), a retarding agent. A natural rubber-ISAF black tread stock with 2.4 to 2.6% sulfur, 0.5 to 0.6% Santocure plus about 0.5% Vultrol is typical.

(5) *N - Oxydiethylenebenzothiazole - 2 - sulfenamide [(NOBS Special and NOBS No. 1) (90% NOBS Special plus 10% MBTS)]:* NOBS Special is a thiazole accelerator with outstanding delayed action which is strongly activated by DPG and other basic materials. In the absence of substantial amounts of furnace blacks NOBS Special may require activation by DPG or by a thiuram monosulfide. The NOBS accelerators are used in natural rubber-furnace black tread stocks and in GR-S-furnace black tread stocks with or without DPG activation. A natural rubber-HAF or SAF black tread stock with about 2.5% of sulfur and about 0.5% NOBS Special is generally used.

(6) *Tetramethylthiuram disulfide (TMTD) (Methyl Tuads, Thiurad, Thiuram M, Tuex, and SA-52):* TMTD is an ultra accelerator which finds use as the primary accelerator in the slow curing Butyl rubber tube stocks. A Butyl rubber tube stock with 2.0% sulfur, 0.5% MBT and 1.0 to 1.25% TMTD is commonly used.

The percent of accelerator and sulfur shown in the various compounds above are based on the rubber hydrocarbon.

In addition to the above accelerators there are a few others, such as tetramethylthiuram monosulfide (Monex, Mono Thiurad, Thionex and Unads), N-tertiarybutylbenzothiazole-2-sulfenamide (Santocure NS), and a few activating materials such as dibutyl ammonium oleate (Barak) and Aktone (a urea complex), which have a somewhat limited use.

With the above accelerators sulfur is used as the vulcanizing agent and the curing system is generally completed with 3 to 5% zinc oxide plus 1 to 3% stearic acid for activation. Insoluble sulfur finds some use where blooming on uncured stock is a problem.

New Accelerators on the Way

For the foreseeable future, it appears that sulfur will continue to be the vulcanizing agent for tires and tubes being made from the present elastomers or to be made from new polymers of similar types. Radically new and different polymers, which may show promise for tires and tubes, may well require new curing systems for their best performance.

In the future we can expect some new benzothiazole-sulfenamide type accelerators with more delayed action than those now commercially available. It is believed some improvement in accelerators for camelback will be made but it is too early to tell what the nature of these new chemicals will be.

Accelerators for Extruded Mechanicals and Wire

By A. M. NEAL

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A COMMON characteristic of both extruded mechanical goods and wire and cable is that no deformation or distortion of the finished product can be tolerated during the vulcanization step. This requirement places a severe limitation on the accelerator and curing system employed. The two most important considerations are processing safety and the requirement for a fast set-up.

Although processing safety is always an important criterion of practicability it becomes of even greater importance in these items because the extrusion process that they all must undergo as the final step in their preparation presents an additional source of "heat history" and greatly increases the chances for scorch. Furthermore, since close tolerances in the final product are normally required for these products even the smallest amount of scorch taking place during the extrusion step is almost sure to result in unsatisfactory finished goods.

The requirement for fast set-up is caused by the fact that, since the final product is usually not supported during the curing step, it is necessary that vulcanization start before plastic flow due to heat takes place. Referring to Dr. Garvey's chart, this can be expressed by the fact that for this class of compounds the area A-2 must be as small as possible, and generally speaking, the slope of the curve during the vulcanization time should be as steep as possible. Failure to fulfill this requirement will completely offset all of the careful work which has been done to insure that the unvulcanized extruded part has met all of the specifications of the final product.

Both laboratory studies and factory experience have shown that with either GR-S or natural rubber the requirements just discussed are best fulfilled when a thiazole is used as the primary accelerator and if activation is required, as it usually is, the activator is selected from the class of the thiuram accelerators. Except where special properties, i.e., heat resistance, are of major consideration the sulfur level is conventional, usually being in the range of 1.5 to 2.5 parts. When employing neoprene for this type of product it is almost always necessary to use an accelerator.

The effects to be expected when a thiazole is activated with a thiuram can best be understood if one considers a specific case, i.e., a GR-S stock containing 2.5 parts of sulfur and 1.5 parts of MBTS. If a thiuram monosulfide is added to this stock the following effects will be found: First, scorch time will be decreased, although not as drastically as when a basic accelerator such as a guanidine or an aldehyde amine is employed as the activator. Second, the rate of cure will be increased or, considered from the standpoint of the problem set forth in this discussion, the time between the beginning of vulcanization and the development of maximum properties of the vulcanizate will be markedly decreased. Third, the modulus of the stock will be increased. Fourth, the plateau effect, so important from quality considerations, will not be markedly reduced.

In most cases, the amount of thiuram monosulfide used will vary from 0.05 to 0.5 part. If the thiuram content is increased over this range, the effect on rate of cure and modulus increase will be about proportional to the amount of thiuram used. Most of the effect on scorch rate will be observed with the first increments of thiuram monosulfide and above approximately 0.1 part the effect will be small. In order to maintain the good plateau effect, it will frequently be necessary to adjust the sulfur content downward, when higher levels of the thiuram are employed.

Three methods of curing these articles are worthy of some discussion. The first, or oldest method, will be called the conventional method. The second, applicable primarily to wire and cable, is popularly called the CV method of curing. The third, and newest of them, is frequently called dielectric curing.

In the conventional method the articles are usually cured in open steam at temperatures ranging up to approximately 300°F. The time of cure will, of course, be dependent upon the temperature and the thickness of the article. In general, the times will range from 30 to 90 minutes. A typical acceleration for GR-S compounds cured by this method would be sulfur 2.5, Zenite 1.5, and Thionex 0.1. A typical Neoprene Type GN stock would contain 0.35 part of NA-22.

CV curing has been applied primarily to wire and cable stocks. In this method the wire is cured at temperatures of approximately 400°F. and the curing time is measured in seconds, normally from 15 to 60 seconds. The great commercial success of this type of curing in the wire industry has been closely associated with the ability to run stocks which are very highly accelerated. A typical acceleration for a GR-S wire insulation stock would be sulfur 2.5, Zenite 3.0, and Thionex 1.5. Note particularly the high level of both primary accelerator and activator in this formulation. Neoprene jacket stocks which can be run equally well in a CV cure should contain 1 part of NA-22.

In dielectric curing the heating is brought about by means of radio frequency waves, usually those ranging from 8 to 27 megacycles per second. The successful use of this method depends upon the dielectric properties of the elastomeric compound being cured. It has found its greatest application to date in the drying and curing of latex foam articles. However, it has been applied with considerable success to many extruded items. It has not been adapted successfully to wire as yet due to the problems arising from the presence of the conductor in the wire. Mere size places no limitations on the type of product which can be successfully cured by this method since the heat is generated uniformly throughout the article.

Cure times approximate those encountered in CV curing, a normal factory cure being of the order of one minute. Very fast acceleration is required in order to prevent the development of porosity, and this requirement means that the unvulcanized article has a very short storage stability and the stocks may be extremely difficult to process in the factory. Accelerations of the type previously discussed are generally not fast enough for this type of curing. Satisfactory results have been obtained by substituting MBT for the MBTS or other derivative normally used as the primary accelerator and a metal or ammonium salt of a dithiocarbamate for the thiuram sulfide as the activator.

Questions and Answers

Question—What curing system is best to keep the cold flow of Neoprene Type GN-A to a minimum? What effect do curing systems have on cold flow of ether polymers?

Answered by Dr. Neal: The best information seems to indicate that cold flow is more a property of the state of cure of the elastomer than it is of how the state of cure is obtained. Cold flow can always be minimized by obtaining a very full cure in the product under consideration. This seems to be true regardless of the type of elastomer. For Neoprene Type GN-A stocks this property can be obtained through the use of an accelerator such as Permalux or NA-22. It is extremely important with neoprene stocks designed for resistance to cold flow to avoid the use of a retarder such as MBTS. For GR-S or natural rubber the best resistance to cold flow is obtained through the use of a thiuram type of acceleration. An alternative curing system which will give excellent results is a thiazole activated with a thiuram. Cold flow properties are sometimes confused with changes due to crystallization. If crystallization is a factor best results can be obtained in a neoprene stock by substituting Neoprene Type GRT or WRT for the GN-A.

Question—What are the advantages and disadvantages of liquid accelerators for latex foam and film compounding? What about the future of same?

Answered by Mr. Waterman: Liquid accelerators used in latex are either self emulsifying or water soluble. Their advantages in latex foam and film compounding are that they are easy to add, store and dispense with no settling out of a compound. Another advantage is that they are ready to use. Their disadvantages are that they may upset the gelation system (especially the water soluble types) and they foam.

In foam which is washed before the cure is complete, some of the accelerator may be removed during the washing (especially the water soluble types). In film compounding, some of the accelerator may be removed from very thin films which are leached before cure. The water soluble type may be more troublesome than the self emulsifying type in this respect.

The increased use of synthetic latices with controlled particle size indicates increased use of liquid accelerators in the future.

Answered by Mr. Davis: A number of liquid accelerators are water soluble or are water solutions of alkali metal salts of dithiocarbamic acids. These are ultra accelerators and are too fast for general dry rubber compounding. These water-soluble accelerators tend to increase the water absorption of the vulcanizate and have an adverse effect on the electrical properties of the cured rubber. Most other available liquid accelerators are aldehyde amines which, in general, are effective high temperature accelerators offering a wide range of curing and scorch rates. They generally give good aging vulcanizates but show varying degrees of discoloration so that some of them cannot be used in the best white rubber.

There is generally some loss of accelerator in handling liquid accelerators, to which some compounders have objections. During the 1920's and early 1930's a number of liquid aldehyde amine accelerators were used fairly extensively but at present there appears to be no very extensive use of these accelerators. For the foreseeable future, no outstanding growth in the use of these liquid accelerators in dry rubber compounding appears likely.

Answered by Dr. Garvey: The advantage of a liquid accelerator is in the ease and completeness of dispersion. This, of course, presupposes that the liquid is soluble in the rubber and preferably miscible with it. In this case an excellent dispersion is easily obtained and the liquid will diffuse on standing to give a homogenous mixture with the rubber. Another advantage might be in automatic feed to a Banbury mixer by means of a proportioning pump.

The disadvantages are in compounding and milling. It is a little more difficult to weigh and handle a liquid than it is a solid and to clean out the container. On an open mill a liquid is a little more difficult to incorporate than a powder unless the liquid is added with a pigment. This difficulty would not apply in a Banbury.

Both the advantages and disadvantages inherent in the liquid state are relatively minor and it is doubtful if they would be decisive except where other factors are nearly equal.

Question—What is the effect of type and amount of accelerator on tread cracking of truck tires?

Answered by Mr. Baker: The cracking that may be experienced in truck treads can be influenced by the type and amount of accelerator used. However, today it is a generally accepted fact that the basic acceleration for truck treads is a thiazole type. In some few cases there may be a secondary accelerator used but this will be in a low ratio to the primary accelerator. The thiazole type accelerator is one that usually gives good flex life to a compound. Some other types of accelerators, such as aldehyde amines and guanidines, are not as good as the thiazole type but they are not used to any extent in truck tires.

The amount of accelerator used does have a bearing on the flex life of a compound. If the accelerator ratio is too high in a compound, an overcure may be obtained and this fact coupled with the persistency of the accelerator will cause excessive cracking. In some instances, too low an acceleration ratio will also promote cracking. A well balanced cure is usually best for flex life.

Answered by Dr. Garvey: Tread cracking must be balanced against tread wear and especially against heat build-up. This balance seems to be a question of state and type of cure. The significance of type of cure is a little vague but it seems to depend somewhat on the type of accelerator and the amount of sulfur. The state of cure is more definite. A high state of cure, or a tight cure, generally means low set and low heat build-up. It is usually accompanied by poor tear and poor crack resistance. A low state of cure generally means high set and high heat build-

up and is accompanied by good tear and good crack resistance.

Present indications are that the best balance for truck tire treads is obtained with thiazole type acceleration and sulfur levels between 2.25 and 3.0 PHR, usually between 2.5 and 2.75 PHR. The type and amount of thiazole acceleration must be adjusted to give a good cure with this amount of sulfur, with scorch time and cure time adjusted to factory requirements.

Answered by Mr. Davis: Assuming that the other factors besides the accelerator-curing system involved in truck tire tread cracking have been eliminated, then for the best resistance to cracking the right type of accelerator and proper amount of sulfur must be used. Natural rubber is generally used for truck treads. Over the years the thiazoles have given about the best results. In channel black tread stocks, close to 2.9 to 3.0% of sulfur with sufficient accelerator (about 1.0%) to give the optimum cure has given the best results. Undercures and overcures seem to crack earlier than optimum cures. In the case of truck tread stocks with the usual channel black-furnace black mixture, 2.75 to 2.9% sulfur with 0.75 to 1.0% MBTS appears to give good results. In the case of truck tread stocks with furnace black, it seems desirable to keep the sulfur ratio close to 2.5% with about 0.5% of a good delayed action accelerator of the benzothiazole-2-sulfenamide type for safe processing.

Question—What accelerator combination for latex foam produces the shortest cure in steam at atmospheric pressure?

Answered by Mr. Waterman: The following acceleration is recommended for 100% natural rubber and 70% natural rubber—30% GR-S blends:

Zinc oxide	5.00
Sulfur	2.00 to 2.25
Zinc salt of mercaptobenzothiazole	1.00 to 1.50
Zinc diethyldithiocarbamate	1.00
Aldehydeamine	1.00
or	
Guanidine	0.75
Activated dithiocarbamate	0.50
or	
Water-soluble dithiocarbamate	0.50

Question—Is a dicumyl peroxide type curing system being used commercially? What advantages or disadvantages has this type cure shown in tires and industrial products?

Answered by Dr. Neal: The use of the dicumyl peroxide curing system probably cannot yet be classified as being used commercially. It has, however, already been employed on a semi-commercial scale. In view of the short time that this product has been available such progress is indicative of real merit. The chief advantages of this method of curing are complete lack of color imparted by the system, the closely related ability to produce stocks which are non-staining, the fact that it is possible to produce vulcanizates with outstanding resistance to compression set, and excellent low temperature properties. The chief disadvantages are the inability to cure in the presence of large volumes of air and the lack of auxiliary agents which will either accelerate or retard the curing action.

Question—What explanation as to structure of vulcanizates can be given to explain heat aging properties of a non-elemental sulfur cured compound compared with a conventional sulfur cure?

Answered by Dr. Garvey: First, we will confine ourselves to a conventional sulfur cured vulcanizate and a heat resistant one cured with thiuram disulfide. Currently accepted theory is that vulcanization is caused by cross-links established between the fiber molecules of the unvulcanized rubber. Molecularly speaking, the vulcanizate is a tangled mass of fibers in which crossing fibers are periodically welded together by chemical reaction. These chemical cross bonds by locking in some of the mechanical entanglements also establish a certain number of mechanical cross bonds. A physical analogy would be a mass of steel wool in which the individual steel fibers were spot welded at various places.

Originally, both the sulfur cured and the thiuram cured vulcanizates have structures similar to this. On heat aging, however, the thiuram cure retains this structure much better than the straight sulfur cure. It has a more stable structure. We know that heat aging involves destructive action due both to heat itself and to oxidation.

It is fairly well established that cross bonds of different chemical types are formed in different kinds of vulcanizates or even in different amounts in the same vulcanizate. Some such bonds are more resistant to heat aging than others. One explanation then is that more stable bonds, say monosulfide or carbon-to-carbon bonds, are formed in thiuram cures while less stable bonds, say disulfide bonds, are formed in conventional sulfur cures. I feel confident that such differences, and possibly these exact differences, in chemical type of cross bond are a major factor in the superior heat resistance of thiuram cures.

However, since the degrading action of heat and oxygen undoubtedly affects the fiber as well as the cross bond, there is probably a constant degrading action going on as shown by the reversion of a natural rubber compound. Stability of structure then requires a corresponding building or vulcanizing action of about the same rate. Hence, I still like the idea I expressed some years ago that in heat-resistant stocks there is a dynamic equilibrium which maintains a fairly uniform molecular structure in the vulcanizate. The breakdown due to heat and oxygen is almost balanced by the build-up caused by the continuing vulcanization reaction of the thiuram or its decomposition product. In the conventional sulfur cure, this continuing reaction is either much less than in the thiuram cure or it is absent.

There is one other factor. The relatively large amount of thiuram, and again I must say or its degradation products, must act as an antioxidant both for the degrading and the cross-linking actions of oxygen. In natural rubber, where the degrading action predominates, the antioxidant action is not readily distinguishable from the continuing vulcanizing action. However, in the styrene and nitrile rubbers, where oxidation causes increasing modulus, hardness and embrittlement, increased vulcanizing action should accentuate the hardening. Here, however, the heat-resistant stocks harden less than sulfur cured ones. Hence, I conclude that in thiuram cures the cross-linking or vulcanizing action of oxygen is inhibited.

In brief, my answer is that, compared to conventional sulfur cures, the thiuram cures give cross bonds of a more stable chemical type; they exert a continuing vulcanizing or cross-linking action of oxygen.

Question—What is the function of zinc oxide and stearic acid in curing systems? Are either or both necessary?

Answered by Mr. Waterman: Zinc oxide functions as an activator in natural rubber, nitrile, and GR-S latices. It is used as a vulcanizing agent in neoprene and carboxylic nitrile latices. Stearic acid, as such, is not used in latex compounding. Both natural and synthetic latices contain fatty acids or other emulsifiers. These emulsifiers accomplish the function of stearic acid in milled rubber. The presence of a zinc bearing material is necessary for cure. Zinc oxide normally serves this purpose. However, various other zinc bearing materials can be used.

Answered by Dr. Garvey: Practically all of the current accelerators require zinc oxide to be most effective and to impart the best quality to the compound in which they are used. The zinc oxide in turn is most effective in the presence of stearic acid or some equivalent fatty acid. Apparently, a nascent zinc salt is most effective and this is obtained by the reaction of stearic acid, zinc oxide and accelerator in situ. Absorption of small amounts of hydrogen sulfide by the nascent zinc soap is probably a factor also. For best results both zinc oxide and stearic or other fatty acids are necessary. The fatty acid may be present in sufficient amount in the rubber and hence may not need to be added separately. However, since a little excess fatty acid, up to the point of bloom, is not usually harmful, it is considered safest to add stearic acid when there is doubt as to the amount present.

Question—What is the lowest practical sulfur content for the following tire compounds: (1) Cold rubber, oil masterbatch and natural rubber tread compounds with HAF and ISAF black loading for passenger and truck tires? (2) Truck tire body stocks?

Answered by Mr. Baker: The data obtained in laboratory tests using low sulfur content treads may be a little misleading since actual road tests do not always give the expected service for a compound. In the case of cold rubber and HAF black, about 1.6% sulfur on the rubber seems a practical low limit. In the case of oil-extended GR-S, if we consider only the GR-S content then oil-extended GR-S will require a higher sulfur than non-oil extended if a satisfactory cure is obtained. The oil content of the polymer will require some sulfur and the higher the oil content the more sulfur is required.

Passenger crude rubber-HAF treads may go as low as 2.0% sulfur, but usually the sulfur content is nearer 2.25 to 2.5%. Truck crude rubber-HAF treads may have sulfur ratios as low as 2.25%, but in most instances it will be nearer 2.4 to 2.7%. In general, low sulfur ratios tend to produce poorer abrasion and in some cases poorer flex life than the normal sulfur ratio. There is little if any difference in the amount of sulfur required with HAF or ISAF blacks.

Truck tire body stocks are mainly of natural rubber and require sulfur ratios of from 2.25 to 2.75%, depending on the stock. If the sulfur ratio is too low there is the problem of high heat generation, which is very detrimental. A rather general sulfur ratio would be 2.6 to 2.75%.

Answered by Mr. Davis: For cold GR-S-furnace black tread stocks, 1.6 to 1.75% of sulfur seems to be about the lowest practical sulfur content. For GR-S-oil masterbatch, this figure seems to be about 2.0% on the GR-S hydrocarbon. For natural rubber treads with furnace blacks, the lowest practical sulfur content appears to be 2.4 to 2.6% on the rubber. For truck tire body stocks, the lowest practical sulfur content appears to be close to 2.6 to 2.8% on the rubber.

Question—What curing systems are recommended for the best heat resistance in the common elastomers?

Answered by Dr. Neal: The heat resistance of any elastomeric product is dependent upon the base elastomer used and the type of curing system employed. No attempt will be made to try to compare the heat resistance of the various elastomers but only to indicate which curing system gives the best heat resistance for the specific elastomer.

With natural rubber and the butadiene-acrylonitrile polymers, the best heat resistance will be obtained through using a high thiuram disulfide, non-sulfur stock. An alternative method to get good heat resistance will be a low sulfur, high thiazole stock. Only slightly inferior heat resistance will be obtained by activating the low sulfur, high thiazole stock with a thiuram. With GR-S, the best heat resistance will be obtained by using a low sulfur, high thiazole stock, which will probably have to be activated with a thiuram in order to have a practical rate of cure.

With neoprene stocks, the best heat resistance will be obtained through the use of high amounts of zinc oxide coupled with NA-22 as the accelerator. In general, Neoprene Type W stocks will give slightly better heat resistance than Neoprene Type GN stocks. The addition of nickel dibutyl dithiocarbamate to this stock will further increase the heat resistance. With Hypalon stocks, the best heat resistance is obtained by using a mixture of magnesia and litharge as the curing agent instead of either of them individually. NBC will also assist these stocks. With Butyl rubber, the best heat resistance is obtained by employing quinone dioxime or its dibenzo derivative in conjunction with litharge.

In all cases, stocks designed for heat resistance should contain an adequate quantity of a good heat resisting antioxidant, although the proper selection of the curing system will be more important than the proper selection of antioxidant.

Answered by Mr. Baker: Maximum heat resistance can usually be obtained in the common elastomers by the use of 3 to 4% of the tetramethylthiuram disulfide and 3% of Santocure may be slightly superior in heat resistance. There are other combinations that give very good heat resistance without the use of a high thiuram content. For instance, about 1.5% of tetramethylthiuram disulfide and 1.5% of Sulfasan R will give heat aging about equal to that obtained with 3 or 4% of tetramethylthiuram disulfide alone in most cases.

Answered by Mr. Davis: For natural rubber, a sulfurless cure with about 3 to 3.5% tetramethylthiuram disulfide with 0.5% Telloy is generally recommended. In the case of nitrile rubber, 0.2% sulfur with 3.0% tetramethylthiuram disulfide plus 3.0% MBTS is recommended. For GR-S, about 3.5% tetramethylthiuram disulfide plus about 1.0% MBTS is commonly recommended. In the case of Butyl rubber, the best heat resistance is obtained with Butyl 325 containing about 25 parts of zinc oxide using the quinoid cure system. An example of this system would be:

Sulfur	2.00
p-Quinone dioxime	2.00
MBTS	4.00
Lead peroxide	5.00

Question—What is the best curing system to minimize water swell of neoprene and GR-S latex compounds? Is there a relationship between water swell and chemical resistance?

Answered by Mr. Waterman: In latex film, water swell is a measure of rewetting and re-emulsification. A tight cure and the absence of hydrophilic materials in the finished article will minimize water swell. A compound for low water swell in neoprene latex is as follows:

Clay (low water swelling)	20.0
Zinc oxide	5.0
Sulfur	1.0
Zinc dibutyl dithiocarbamate	1.0

A compound for low water swell in GR-S latex is as follows:

Zinc oxide	5.0
Sulfur	2.0
Activated dithiocarbamate	2.0 to 3.0

There is no clear-cut relationship between water swell and chemical resistance.

Answered by Dr. Garvey: The curing system as such has relatively little influence on water swell. A tight cure helps some to reduce water swell but it is a minor factor. Water swell in hydrocarbon rubbers is largely an osmotic effect. Water-soluble materials and hydrophylic materials in the compound induce water absorption. Thus, water-soluble materials, such as salts, free acids, etc., should be eliminated as completely as possible. Rubbers which themselves contain hydrophylic groups swell more in water than the hydrocarbon polymers.

There is apparently no direct relation between water swell and chemical resistance. Water-soluble chemicals may penetrate further and react faster if the rubber is swollen by water. On the other hand, chemicals dissolved in water tend to reduce the swelling of the rubber in the water, again apparently an osmotic effect.

Answered by Dr. Neal: The maximum water resistance for both neoprene and GR-S compounds will be obtained on vulcanizates which have a very full state of cure. With neoprene compounds, it is important to use a litharge type of cure rather than the magnesia-zinc oxide cure conventionally used with such compounds. With GR-S stocks, it appears that the choice of the filler loading will be far more important than the choice of the curing system.

If chemical resistance is restricted to the attack by aqueous solutions of chemicals it is obvious that there is a direct relationship between water swell and chemical resistance. However, in its broader aspect, chemical resistance involves attack by non-water soluble chemicals, i.e., hydrocarbons and organic esters. In this case there is no direct relationship between water swell and chemical resistance, although in general the best chemical resistance like the best water resistance will be obtained in a product which has the highest state of cure.

Question—What accelerator curing system is recommended for (a) fast-curing, high modulus Butyl vulcanizates, and (b) blends of halogenated Butyl and natural rubber compounds?

Answered by Mr. Davis: The quinone dioxime curing system is recommended for fast curing, high modulus Butyl vulcanizates. An example of this would be 6 parts of Dibenzo GMF plus 10 parts of red lead. Published data indicates that in a blend of brominated Butyl and natural rubber with HAF black, 2% of sulfur with 1% of MBTS gives good results. If desired a little DOTG may be used with the MBTS. [See *Ind. Eng, Chem.*, Vol. 47, pp. 1562-69(1955)].

Answered by Dr. Garvey: Probably the fastest curing, highest modulus Butyl compounds are those with quinone dioxime, GMF, (2.0 PHR) and red lead or litharge (4.0 to 5.0 PHR). Next will come sulfur cures with 1 to 2 PHR of sulfur, 1 to 2 PHR of a thiuram disulfide, and 0.25 to 0.50 PHR of Polyac, dinitrosobenzene. However, both of these types are scorchy and cause bad discoloration and staining. If staining is objectionable, it is necessary to go to the usual sulfur-thiuram type of cure with 2.0 PHR of sulfur and 1 to 3 PHR of tetramethylthiuram disulfide. Some increase in cure rate and modulus is obtained by replacing half the thiuram with either selenium or tellurium dithiocarbamate.

The makers of halogenated Butyl rubber recommend essentially the same curing system used with GR-S, namely (PHR):

Sulfur	2.00	2.00
MBT	0.50 or 1.00	
TMTDS	0.50 or 0.25	

Question—Under what conditions will carbon disulfide cure rubber? Are amine type activators and sulfur necessary? What is a good reference to this work?

Answered by Mr. Davis: About 1920 Bruni found cold vulcanization of rubber containing zinc oxide, sulfur and an aromatic amine could be obtained by exposure to carbon disulfide vapors. The zinc oxide, sulfur and amine appear necessary. There is a reference to this work in "Science of Rubber" by K. Memmler, American Edition, by Dunbrook and Morris, page 325. A reference can also be found in *Giorn. Chim. Ind. Applicata*, Vol. 3, p. 196 (1921).

Question—What curing systems produce maximum flex life in the common elastomers?

Answered by Dr. Neal: With natural rubber, maximum flex life is obtained by using a thiazole as the accelerator. Although it has not been fully established, the predominance of evidence seems to indicate that slightly improved flex resistance is obtained with a high state of cure. With GR-S compounds, the flexing problem becomes one of cut growth rather than the inception of cracks. The evidence seems to show that an overcured condition leads to extremely poor cut growth resistance. This factor seems to be far more important than the choice of accelerators used. From a practical standpoint the problem has been solved best by keeping the sulfur content low as a means of preventing overcure and using a thiazole or an activated thiazole for the accelerator. Neoprene stocks are so flex resistant that types of curing systems have very little effect. There is some indication that high states of cure do have a moderately adverse effect.

Answered by Mr. Baker: The thiazole type accelerators usually provide good flex life to a compound. Thiurams also are good in some compounds as are certain combinations of thiazoles and thiurams. As a class, however, the thiazoles are considered to be capable of producing good flex life in most of the present day elastomers.

Question—What curing systems are recommended for neoprene, GR-S, nitrile, and natural rubber compounds at temperatures under 140°F.?

Answered by Mr. Waterman: For natural rubber the following system is frequently used: Zinc oxide, 5; Sulfur, 1; Activated dithiocarbamate, 2 to 3. Neoprene, GR-S and nitrile latices require temperatures in excess of 140°F.

Answered by Dr. Garvey: The fastest curing accelerators for all of these except neoprene are the zinc or amine salts of dithiocarbamates. These may be used in conjunction with MBT or its zinc salt. From 1 to 3 PHR of sulfur with 1 to 2 PHR of zinc dimethyl dithiocarbamate or diethyl ammonium diethyl dithiocarbamate or Pip Pip are good systems. They can sometimes be activated by excess amine, say 1 to 3 PHR. The addition of 1 to 2 PHR of MBT or zinc MBT will improve aging some and may give a slight kick to the cure. For neoprene, aldehydeamine acceleration is probably best, with litharge and sulfur helping. One good system is: Accelerator 808, 2.0; litharge, 10.0; sulfur, 2.0.

Question — What accelerator combination do you recommend for natural and GR-S chemically blown sponge, cured in rolls, continuously moving through presses, in thicknesses from ⅛-inch to ⅜-inch?

Answered by Mr. Baker: Chemically blown sponge that is processed through a continuous cure cycle in thicknesses of ⅛ to ⅜-inch can be accelerated with a combination of a thiazole such as n-cyclohexyl-2-benzothiazole sulfenamide and DPG. This is particularly true when working with GR-S. Natural rubber sponge can also be produced with such an acceleration. As an alternate, a combination of a thiazole with a thiuram may be used and this is excellent in natural rubber. In natural rubber, a combination of MBTS and tetramethylthiuram monosulfide in a ratio of about 90/10 to 85/15 gives a good lively sponge. In a GR-S chemically blown sponge, the accelerator content usually runs fairly high due to the large amount of oil that is usually employed. It may run around 1.5% of Santocure and 1.5% of DPG on the GR-S content. The sulfur content is usually up around 3.5 or 4% on the GR-S for the same reason.

Question—Is it necessary to sacrifice good physical properties to accomplish a rapid cure rate in natural rubber mechanical goods compounds?

Answered by Dr. Neal: The problem here is to produce a compound that will have a very good plateau effect and still give a rapid enough rate of cure. For most cures the use of a substantial amount of a thiazole as the primary accelerator activated with a thiuram monosulfide will give a sufficiently rapid rate of cure without sacrificing any of the aging characteristics or other desirable properties of the finished vulcanizate. It is recognized that in a few cases where extremely rapid cures are necessary this combination may not be quite fast enough. Conventionally, these cases have been handled by using a thiuram as the accelerator. Such stocks, of course, do have a tendency to have a peak type of cure with properties falling off rapidly on overcure.

A suggestion of a method of overcoming this difficulty without sacrificing speed of cure might be to use a high amount of a thiazole as the primary accelerator and activate it with a small amount of an aldehydeamine such as Accelerator 808. Such stocks will have a very rapid rate of cure, a good plateau region allowing maximum flexibility in curing cycles, but will be extremely scorchy and difficult to process in the factory.

An alternate suggestion which was used successfully by several tube manufactures in the days of natural rubber inner tubes was to use a thiazole such as Zenite and activate it with a combination of a small amount of Thionex and some DOTG.

Question—What effect do accelerators have upon viscose yarns if any?

Answered by Mr. Baker: As far as we know there is no apparent effect on viscose yarns when in contact with any of the commercially used accelerators. Experimental work with viscose yarns in contact with much higher concentrations of accelerators than would be encountered in practical compounding did not indicate any deterioration. Under certain conditions viscose yarns may present color problems with certain accelerators. The conditions imposed upon the yarn may be of greater importance than the accelerator. Color change is more likely to be influenced by antioxidants than by accelerators.

Question—Are there new accelerators or curing systems that are safer processing and which produce compounds that display longer bin aging characteristics?

Answered by Mr. Davis: The newest benzothiazole sulfenamides, such as Nobs Special, etc., give safer processing and longer bin aging characteristics than earlier accelerators. However, the heat history of the stocks must be controlled in order to get the best processing safety and bin aging from these good delayed action accelerators.

Question—Why should retarders be used?

Answered by Dr. Garvey: Logically it is rather hard to justify the use of retarder with an accelerator and generally it is possible to develop suitable acceleration without retarders. In some cases, however, the use of a retarder may give the best or simplest answer. The best combination of properties may be obtained with a compound which is just a little too scorchy. A retarder may make the compound operable without sacrifice in quality. It may be quicker and easier to use this combination than to develop an entirely new type of acceleration. A compound may work well in winter but give excessive trouble in hot weather. The addition of retarder in hot weather may eliminate the need for more drastic changes and the retarder can be removed from the recipe when the weather again gets cold.

Question—For a given GR-S tread compound cured with conventional sulfur-accelerator systems, is the temperature coefficient of vulcanization rate a true constant or does it vary with temperature?

Answered by Mr. Baker: The temperature coefficient of vulcanization rate is not a true constant. It varies with the temperature, accelerator and compound used.

Question—Are there accelerators and/or curing systems that are inactive at processing temperatures that can be treated with atomic radiation or other means to make the compound highly active at (a) curing temperatures and (b) room temperatures?

Answered by Dr. Neal: The use of atomic radiation as a means of vulcanizing elastomeric materials is still in its infancy and no practical system has yet been devised. Theoretically, any material which can be vulcanized by a peroxide should also be capable of being vulcanized by radiation and since most of the common elastomers fall in this class it is not too much to hope that some time in the future practical systems may be developed. This is particularly true since the production of electrical power from atomic processes is accompanied by the production of waste products which are a potent and economical source of active radiation.

It would be anticipated that the unvulcanized stocks themselves would be extremely inert until subjected to radiation and, therefore, processing difficulties would be reduced to a minimum. Experimental work has already been carried out with both beta and gamma radiation. The use of beta radiation would be restricted to thin walled articles, but this limitation should not be encountered with gamma radiation. One of the major experimental difficulties so far encountered with this type of curing has been the prevention of drastic overcures.

Question—What acceleration is most satisfactory for earthmover and off-the-road treads and carcass stocks?

Answered by Mr. Baker: Earthmover and off-the-road type treads require a stock that is high in tear resistance and chunking resistance. The thiazole type accelerator is good for this type service and in addition it is a nonreverting type accelerator which is necessary because of the long cure required for such stocks. The thickness of the extruded tread is such that a delayed action accelerator is very desirable. Santocure, NOBS, NOBS Special and Santocure NS are suitable accelerators for such treads and carcasses. These stocks are mostly natural rubber and the carcasses are almost sure to be all natural rubber since they are less apt to bruise.

Question—What effect do high processing temperatures in the absence of sulfur have on the delayed action of benzothiazole sulfenamides?

Answered by Mr. Davis: It has been found that 2 minutes' exposure of benzothiazole sulfenamides to a temperature of about 350° F. in the absence of sulfur, but in rubber containing furnace black, appears to completely eliminate the good delayed action these accelerators normally possess.

Question—What effect do high processing temperatures in the absence of sulfur have on the curing strength of accelerators?

Answered by Mr. Davis: Holbrook and Fitzgerald have shown that 2 minutes at about 360° F. in the absence of sulfur cause a moderate to severe decrease in the curing strength of a number of accelerators. (See *Rubber Age*, Vol. 64, pp. 57-59, Oct., 1948).

Question—Is there an optimum sulfur level to be used with different accelerators?

Answered by Dr. Garvey: Yes. For the best compounds with each accelerator there is an optimum sulfur level within rather narrow limits. There is, of course, some spread and the best level will depend partly on pigment, softener, etc. This does not mean that good compounds cannot be made at other sulfur levels. In some cases where special combinations of properties are desired, or where special types of compound are being used, the sulfur-accelerator ratios may be quite different from what we usually consider the optimum. In natural rubber, I would put the optimum sulfur levels approximately as follows: aldehydeamines—3 to 5 PHR; thiazoles—2 to 4 PHR; thiuram—1 to 1.5 PHR.

Question—Are there improved curing systems in sight which will allow a wider range of cures without producing harmful aging effects?

Answered by Mr. Waterman: We are always working to develop new latex accelerators. Our goal is better aging, minimum discoloration and stamping, flat curing, controlled precuring, and fast low temperature curing. We have found that good aging accelerators are flat curing.

Question—What acceleration system would be used to produce drug sundry items?

Answered by Mr. Waterman: The following systems can be used for low modulus and high modulus stocks:

	Low Modulus	*High Modulus*
Zinc oxide	0.50	2.00
Sulfur	0.25–0.33	1.50
Zinc salt of mercaptobenzothiazole	0.50	...
Zinc dibutyl dithiocarbamate	0.35	...
Tetramethyl thiuram disulfide	...	1.00

Question—If a dry powder mixture containing a benzothiazole sulfenamide, DPG and sulfur, as required for a tread stock, is stored for 24 hours at about 105 to 110° F. (outside the rubber), what effect will this have on the scorch and cure rate when this mixture is used in the tread stock?

Answered by Mr. Davis: Such a treatment of these accelerators and vulcanizing agent causes a marked decrease in the scorch time or processing safety and an increase in the rate of cure of the resulting tread stock.

Question—Are aldehydeamines used to any great extent in present day compounding?

Answered by Mr. Baker: Aldehydeamines are not used to any great extent in present day compounds. Their largest use is in the curing of hard rubber and in latex foam. Trimene Base is the one used in latex foam while in hard rubber there are several that can be used.

Question—What are the accepted accelerators or curing systems used in natural and synthetic latices?

Answered by Mr. Waterman: The following accelerators are widely accepted for latex use: activated dithiocarbamates, dithiocarbamates, thiazoles and thiurams. Those less widely used include the aldehyde-amines, guanidines and thioureas. Sulfur and zinc oxide combinations are used for curing natural rubber, GR-S and nitrile latices. Zinc oxide alone is used for neoprene latices.

Question—What are the differences in acceleration between dry heat cure and steam cure in foam rubber?

Answered by Mr. Waterman: The two acceleration systems are essentially the same except that dry heat cure requires an additional 1.5 parts of an activated dithiocarbamate. The two curing systems then are:

	Steam Cure	*Dry Heat*
Zinc oxide	5.0	5.0
Sulfur	2.0	2.0
Zinc mercaptobenzothiazole	1.0	1.0
Zinc dithiocarbamate	1.0	1.0
Aldehydeamine	1.0	1.0
Activated dithiocarbamate	..	1.5

Question—What are normal curing systems for neoprene and nitrile latex foam?

Answered by Mr. Waterman: The two following systems are in use:

Nitrile Latex Foam		Neoprene Latex Foam	
Zinc oxide	3.00	Zinc oxide	7.50
Sulfur	2.00	Sulfur	2.00
Zinc mercapto-benzothiazole	2.00	Zinc dibutyldithio-carbamate	2.00
Activated dithiocarbamate	.25– .50	Activated dithio-carbamate	1.00

Cell tack is not necessarily an indication of undercure in either neoprene or nitrile foam.

Question—In a mixture of 5 parts natural latex and 3 parts GR-S latex spread on canvas and laminated with a large amount of sulfur for a hard finished laminated material, would a 0.5% zinc stearate increase the water resistance?

Answered by Mr. Waterman: I don't think it would make any difference.

Question—Regarding triggered accelerators, in a job where you are laminating canvas and it is sitting around for some time with a trigger accelerator set for 280°, is there a tendency for that to prevulcanize before you form your material or does that run pretty true to form?

Answered by Mr. Waterman: We have never yet been able to make a good accelerator that will not show some signs of pre-cure.

Question—In a mixture of 3 parts of natural latex and 5 parts of GR-S where you have to use a tackifier for laminating, is it naturally a tendency for the accelerator, if used, to defeat the tackiness and make the laminating problem harder?

Answered by Mr. Waterman: Activated dithiocarbamate will normally defeat the purpose, but if you will use zinc dibutyldithiocarbamate, you will not lose tack normally.

Fawick High-Speed Clutch Controls

To meet higher production demands, the Fawick Airflex Division, Fawick Corporation, 9919 Clinton Rd., Cleveland 11, Ohio, has developed a new series of high-speed clutch controls for presses equipped with pneumatic clutch-and-brake. Compact in size and design, the units are said to be easily adapted and installed on new or old presses. The controls are offered in three enclosure sizes. All three are equipped to provide non-repeat protection and the functions of inching, single stroke and continuous operation; selection is controlled by the positioning of an exterior oil-tight selector switch. The small, basic control is designed to meet the average requirements of a high-speed press. The medium size control may be equipped for timed-inching or with a size 1 magnetic motor starter. The large size, which is built to conform to Joint Industry Conference (JIC) and National Machine Tool Builders Association (NMTBA) standards, incorporates controls for press clutch and brake, size 1 starter for press drive motor, and externally operated, cover-interlocked disconnect switch. Optional functions of hand-foot, semi-continuous, and timed-inching are available.

Engelberg-Huller Four-Head Grinder

A new contact-wheel abrasive belt machine, permitting four simultaneous grinding operations, has been developed by the Engelberg-Huller Co., 831 West Fayette St., Syracuse 4, N. Y. Designed for high-volume flat surfacing of hard rubber, plastics, ferrous and nonferrous metals, and other materials, the Model 680-4 belt grinder is said to produce micro-inch finishes to exacting tolerances, and permit a single-cycle operation from rough casting to polished part. According to the company, the machine is particularly adaptable to automatic production lines. Parts can be conveyorized for presentation to the conveyor belt, automatically ejected, and carried to the next operation. The size of the machine conveyor belt is 6½ inches by 216 feet. Manual adjustment of conveyor belt speed is obtainable for settings of from 2 to 25 feet per minute. The unit has a maximum piece capacity of 5 inches high, 6 inches wide and any length. The machine is 125 inches long, 51 inches wide, 90 inches high, and weighs 5500 pounds. The heads are powered with either 5 or 7½ hp drives, and the machine can be modified for five- and six-head applications.

Automatic Compounding of Latex Coating Material

THE key to automation in the formulation of coatings for SuperSanitas fabric wall coverings has been found in the use of electrical transducers of weight. The problem at Standard Coated Products Company, Buchanan, N. Y., involved economical production in increasing volume for a new and improved plastic coated fabric wall covering and, more importantly, quality control through uniformity in the production of the coating material.

The new method of automatic proportioning controls the weight of the liquid and solid ingredients that flow into 1500-gallon mixing tanks. It has greatly reduced the amount of laboratory analysis while increasing the efficiency and accuracy of repetitive production of the large batches required to meet growing demands.

Instrumentation, weight transducers, system design and engineering, and installation are all products and services of Baldwin-Lima-Hamilton's new Electronics and Instrumentation Division. Weight transducers, the heart of this system for 1500 and 1000-gallon tanks, are three Baldwin SR-4 load cells of 10,000-lb. capacity each on which the tanks rest. The principle of the bonded resistance wire strain gage, utilized in these cells, permits remote electrical measurement, indication, and recording of weight, as well as use of the signal by a controller to operate equipment associated with materials being weighed.

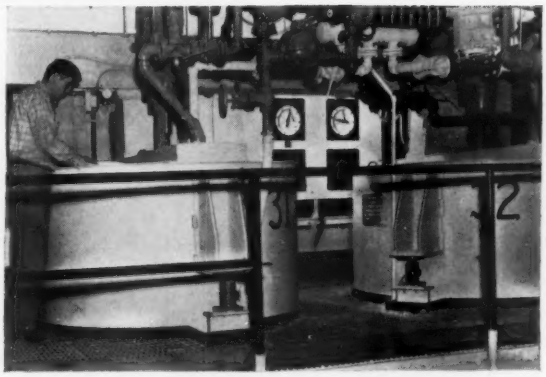
Instrumentation includes five timers by which the duration of each mixing cycle is set. Weighing and mixing proceed simultaneously and independently in response to electrical signals from load cells and timers, causing the opening and closing of valves in three feed lines of the liquid products flowing into the mixing tank, the starting and stopping of a conveyor which carries pulverized clay into the tank, and starting and stopping mixing action in accordance with the preset time schedule.

Operation of the System

Although the operation of each mixing tank provides for automatic proportioning of four ingredients, these materials are actually mixed in two different batches: three of the major ingredients in one batch and two in the other. The instrumentation is set up to handle either batch automatically as determined by a two-position switch. The major ingredients in one batch are water, a resin and pulverized clay. The other batch is a mixture of water and latex plus small quantities of other ingredients. Small quantities of seven other ingredients of the two mixes are added manually. These total only about five percent of the total mix and vary in quantity from four gallons to 68 pounds.

Preparation of a batch is started by pressing a "Start" button. A valve in the water line then opens and water flows into the mixing tank until the load cells signal the controller that the proper weight is in the tank. The water valve then closes automatically and two further actions take place simultaneously. The valve in the resin line opens and the Patterson Unimixer starts. Mixing is done by a vertical, motor-driven shaft with vanes at the bottom. Mixing action is automatically stopped before the resin flow is stopped in order to prevent churning action from affecting the weight measurement of the resin being added.

When the resin line valve closes, two actions take place simultaneously again. This time the conveyor starts feeding pulverized clay into the tank and the mixing action resumes. Again the mixer is automatically stopped while the clay continues to flow into the tank. When the load cells indicate that enough clay has been added, the conveyor is stopped automatically and mixing is started again. At this point the electrical circuit controlling the discharge valve is opened in such a way that the valve cannot be opened while the mixer is running. After a 30-minute mixing cycle the mixer stops and a signal lamp is lighted. The discharge valve is manually opened to discharge the completed mix by gravity into a storage tank below. Electrical interlocks prevent the start button from actuating the equipment again until the discharge valve is closed after the tank has been emptied.



For automatic formulation of latex coatings for SuperSanitas, one 1500-gallon and one 1000-gallon mixing tank are supported on Baldwin SR-4 load cells which serve as electrical weight transducers.

Batch 2, consisting of a mixture of water and latex with other ingredients in minor quantities, is prepared similarly. Normally, the two batches are mixed in different tanks but each tank and instrumentation system is set up to produce both batches. Separate timers are used for each timed mixing action.

Accuracy of all ingredient proportions is held within one-half percent. All liquid ingredients flow through 2-inch pipes and the clay flow on an enclosed conveyor is at the rate of about 5.5 lbs. per second. Weights being measured range from about 3000 lbs. for the empty tank to about 18,000 lbs. with the largest batch.

The system is designed to stop and start again at the same point in the event of a power failure, continuing the cycle from the stopping point after a short warm-up of the instrument. Another limit switch prevents actuation of all control points while the tank is being discharged and tank weight is falling past the points of normal actuation. After the "completed" lamp is lighted, the cycle cannot be repeated until the tank has been discharged, the discharger valve closed, and the start button pushed.

Permits Manual Operation

The system is arranged in such a way as to permit manual operation also. Each feed line has a meter to indicate the volume of material flowing into the tanks. Figures indicated by the flow meters are compared with quantities measured by weight

The use of automatic batching in the production of SuperSanitas contrasts greatly with methods previously used. The system offers a simple means of handling the larger bulk and fluid ingredient requirements, retaining the repeatability of measurement required for product uniformity.

Editorials . . .

Forward Look

EACH time we read the report prepared by the Ad Hoc Rubber Committee of the Office of Defense Mobilization, which was attached to the recent report submitted by President Eisenhower to Congress, in accordance with legal requirements of the Rubber Producing Facilities Disposal Act, our admiration for the grasp of the over-all rubber situation exhibited by the members of the committee is increased. We have read the report at least three times and consider it not only an excellent review of the rubber situation in the past few years but an excellent forecast for the next several years, one which ranks with the best presented to date by outstanding economists, analysts and business forecasters.

It has long been evident that few commodities are as difficult as is rubber when it comes to forecasting either production or consumption. Few commodities are so sensitive to so many variables and never in the long history of rubber has any predictable pattern been developed. As soon as a pattern seems to present itself, such as the ten year increases in consumption which followed a doubling-itself trend in the 1910-40 period, sufficient new variables appear on the scene to cause a reshuffling of the available statistics to break the pattern. Too often have our statisticians been forced to change their rubber production-consumption estimates after the first or second quarters of a single year. We need but to remember the 1955 situation.

In discussing new rubber requirements for the United States, the report of the Ad Hoc Committee emphasized the difficulties involved in accurate forecasting. For example, in discussing U.S. consumption of new rubber (natural and synthetic) for the years of 1947 through 1955, it is pointed out that new rubber use ranged from a low of 989,000 long tons in 1949 to a high of 1,530,000 tons in 1955. However, although the trend was upward it was irregular. Consumption in 1954 (1,233,000 long tons) was lower than the average for the preceding four years (1,268,125 long tons). To put it another way, from 1946 through 1955 the annual fluctuations show five increases and four declines. The rate of increase from 1946-48 (averaged) to 1953-55 (averaged) was 3.44% and because of these averages the committee believes an increase of 3.5% is reasonable for a short-term forecast. This basis should hold despite the current 1956 decline in consumption.

Increases or decreases of any basic raw material such as rubber are of course dependent on the general economic conditions which exist within a country in any specific year or period. In the United States, as the committee points out, the long-term rate of increase in consumption of rubber has been 4.9% annually. That is the rate, compounded annually, necessary to raise the 1922 consumption figure (301,500 long tons) to the 1952 figure (1,261,400 long tons), disregarding intermediate variations, of which there were plenty. Over the same period, the rate of growth for domestic motor fuel consumption was 7.6% and the rate of growth in gross national product (billions of dollars of constant value) was 3.5%. It is only coincidental that the latter growth percentage rate is the equivalent of the increase in rubber consumption predicted by the committee for the short-term period.

Re-emphasizing the point that annual variations in U.S. consumption for future years are not predictable with any accuracy, the committee nevertheless feels that the past statistics furnish a basis for estimating probable aggregate consumption for a period of years. The aggregate consumption in the 1951-55 period was approximately 6,575,000 long tons, an average of 1,315,000 annually. Calculating from this base, and assuming regular continuance of the 3.5% rate of increase, the five-year total for the 1956-60 period is indicated at 7,818,000 long tons, an average of 1,563,600 long tons a year. As the committee views it, annual consumption will be approximately as follows (in long tons):

1956	1,458,000
1957	1,507,000
1958	1,562,000
1959	1,616,000
1960	1,673,000

It should be noted that although the above figures indicate a year-to-year increase pattern, they are actually based on an average scale, since it would be most unrealistic to expect regularity in the progression of annual consumption in the United States. There is not a single purchasing agent in the rubber field who would disagree with this statement.

It should also be noted that the statistics used by the Rubber Manufacturers Association to represent future U. S. consumption of new rubber, as outlined at its last annual meeting, indicate that a new and higher plateau of consumption has now been attained. The prediction made at that time, based on these figures, was that consumption in 1956 and 1957 would be lower than it was in 1955 and would thereafter increase above the 1955 record (1,530,000 long tons). The average annual consumption for 1956-60, based on the RMA estimates, would be approximately 1,535,000 long tons. Accordingly, there is only a difference of 28,600 long tons between the annual averages determined by industry and government statisticians for the 1956-60 period. Both of these forecasts lean heavily on the fact that the additions to our automotive population assure maintenance of a higher level in the consumption of rubber than in the past five years.

Highlights Sidelights of the News...

June, 1956

Difficulties have developed over the disposal of the government-owned alcohol-butadiene plant at Louisville, Ky., to the Union Carbide and Carbon Co. of New York . . . Congress has been asked to approve the sale without the prior approval of the Department of Justice and over the objections of Publicker Industries, Inc., the present operator . . . Publicker had offered to match the $3,125,000 Union Carbide bid after its bid of $2,400,000 had been rejected by the Disposal Commission . . . Congress has until midnight, June 25, to approve or disapprove the sale (page 475).

The long-awaited test of the patents the B. F. Goodrich Co. holds on tubeless tires began early in May when the company's suit against U.S. Rubber for patent infringement opened at Federal District Court in Baltimore . . . Goodrich has another suit pending, this one against Firestone, but this case has yet to reach the courts . . . In the action against U. S. Rubber, Goodrich is asking for an injunction restraining its competitor from further alleged infringements and for a "reasonable royalty" on the tubeless tires U.S. Rubber has made in the last few years (page 484).

Near-record attendance marked the 69th meeting of the Division of Rubber Chemistry of the American Chemical Society which was held in Cleveland on May 16 to 18 . . . Official registration hit almost 1,300, slightly less than the record established at the Philadelphia meeting last autumn . . . The Cleveland meeting featured the presentation of twenty-six technical papers and an invited paper by Arnold H. Smith, first secretary of the Rubber Division (page 480).

Current reports have it that the United Rubber Workers, AFL-CIO, has served notice on the "Big Five" that it wants substantial pay raises for its 34,000 members in Akron plants and 61,500 members elsewhere about the country . . . Formal wage reopening notices now have been transmitted to all of the "Big Five" . . . The notices provide for cancellation of contracts between the company and union if agreement on pay raises is not reached within 60 days (page 486).

Congress is now said to have on hand proposed legislation calling for the disposal of the government-owned synthetic rubber research laboratories at the University of Akron . . . The proposal, drawn up by the National Science Foundation, calls upon the General Services Administration to put the facilities on sale on June 30, 1956, the final day of operation by the University (page 476).

NEWS REPORTS and Industry Activities

COMPLICATIONS ARISE IN PROJECTED SALE OF ALCOHOL-BUTADIENE PLANT TO UNION CARBIDE

A CONTROVERSY over the projected disposal of the government-owned alcohol-butadiene plant at Louisville, Ky., to the Union Carbide and Carbon Corp. of New York City developed in late May when the Rubber Producing Facilities Disposal Commission asked Congress to approve the sale without clearance from the U. S. Department of Justice. Publicker Industries, Inc. of Philadelphia, Penna., the present operator of the facility, has attacked the Disposal Commission for failing to accept a Publicker offer to match the accepted Union Carbide bid of $3,125,000. Focal point of the attack was Attorney General Brownell's refusal to find that the sale to Union Carbide "would best foster the development of a free, competitive synthetic rubber industry." The Disposal Commission had announced the sale to Union Carbide on May 17 and turned over its report to Congress on May 28. Publicker, according to a company spokesman, originally offered $2,400,000 for the Louisville facility and then increased its offer to the Union Carbide level following the Disposal Commission's sales announcement. Publicker's three-year lease on the plant runs to April, 1958, and the sale to Union Carbide is subject to the lease.

It has been learned that the Justice Department did not object to the sale as violating the anti-trust laws. Rather, it held that the sale to Union Carbide would not foster competition. The department indicated the fear that Union Carbide would convert the Louisville plant from the production of butadiene to any one of a number of chemicals not associated with synthetic rubber production. Further, the department raised the likelihood that the sale to Union Carbide would tend to bring about the elimination of the only alcohol-butadiene producer—Publicker.

Justice Department Opinion

The Disposal Commission sought Attorney General Brownell's opinion on the legality of submitting a report to Congress without a Justice Department approval and was given this word: "It is entirely appropriate to submit your report to Congress for a review."

Publicker, on the other hand, contends that the report is illegal. "In our review," Publicker official Lawrence R. Brown declared, "the commission's so-called report to Congress has no validity because it does not contain what is required by law; namely, the finding of the Attorney General approving the proposed disposal. Because of the Attorney General's disapproval, no sale, we believe, can be made to Carbide and nothing that can properly be considered a report can be filed under the Rubber Producing Facilities Disposal Act of 1953."

The Louisville alcohol-butadiene plant was constructed in 1943 at an original cost of $31,352,000. This has been depreciated so that the net book value of the plant is now listed at $6,000,000. If the sale of the plant to Union Carbide is approved by Congress, Union Carbide becomes the new landlord instead of the government, and can either arrange with Publicker to end the lease and take over the plant or allow Publicker to continue operating it. Congress has until midnight, June 25, to either approve or disapprove the sale.

Meanwhile, in a report to Congress covering the first eight months of private synthetic rubber production, Attorney General Brownell stated that no purchaser of government synthetic rubber plants has achieved an "undue influence" on the synthetic market since the government disposed of almost all the facilities a year ago. Mr. Brownell tempered his observation, however, with the warning that this period was not long enough to allow an adequate monopoly evaluation.

The Attorney General's report covers the period May 1 to December 31, 1955, the first eight months of operation under private interests. Mr. Brownell emphasized that a "considerable period of time" must elapse before the Justice Department could make a complete determination on monopoly. On the basis of the early evaluation, however, he found "a number of factors favorable to the development and growth of competition in the synthetic rubber industry."

Key factors working against monopoly, he found, were the existence of ten relatively strong producers of GR-S type rubber and nine butadiene producers. "The market behavior of the producers," he said, "tends to indicate that, despite the presence of a substantial degree of vertical integration, sizable volume of both GR-S and butadiene moves into the open market, thus providing adequate opportunity for normal market forces to come into play in the determination of the industry's level of output and the movement of prices." Mr. Brownell's other findings were:

(1) The present climate in the industry is favorable to expansion by existing producers and entry by new producers, largely because of growing markets both at home and abroad.

(2) With considerable expansion planned and new producers ready to enter the field, "it would appear" that no barriers have been raised to prevent the entry of other firms into the synthetic rubber industry.

(3) Among existing impediments to vigorous competition is a tendency to continue the pattern of product specialization inherited from the government. This pattern of production "would tend to insulate" certain areas from normal competition.

(4) Synthetic prices — tending to inflexibility — should, over the long term, move toward a reflection of normal supply and demand to which should be added the economies of production emerging from the stimulus of competitive free enterprise.

(5) Justice Department support for the sale of Butyl rubber plants to affiliates of the Standard Oil Co. of New Jersey has been "justified" by experience through December 31, 1955.

(6) Small rubber fabricators have obtained a "fair share" of synthetic production at "fair prices."

Mr. Brownell also reported that less than half of the small rubber companies indicated that they had any trouble obtaining

synthetic rubber when it was needed. Most of the small companies that did experience difficulties in obtaining synthetic rubber were buying on the open market. Those companies with contracts fared pretty well, he stated.

Less than 10% of all companies expressed dissatisfaction with the performance of private synthetic producers or foresaw problems in the future. Many smaller rubber companies said the quality of synthetic rubber had improved under private ownership and a "significant number" said they preferred private industry because they received more technical assistance from the companies than from the government.

Laboratory Disposal Planned

According to reports from Washington, the Administration has sent Congress proposed legislation calling for the disposal of the government-owned synthetic rubber research laboratories at the University of Akron by the General Services Administration. The proposal, drawn up by the National Science Foundation, would direct GSA to put the facilities on sale to the public as of June 30, 1956, the final day of operation by Akron University.

Akron University recently turned down a government offer to lease the laboratories through June 30, 1957, rent-free and without government subsidy. The university has operated the laboratories on a cost-plus-fee basis since 1944, but felt the endeavor would be a losing proposition without the support of the government. The university estimated that it would take an annual business volume of about $1,000,000 to operate the laboratories at the break-even point. Operating cost to the government this year is $950,000.

NSF, in sending up the disposal bill, told Congress that the market was such as to offer the government a "sizable recovery" of its investment in the laboratories. Eight industrial firms and non-profit research institutes have indicated an interest in acquiring the facilities, according to NSF.

Under the proposed disposal plan, GSA could transfer the laboratories to another Federal agency if it fails to negotiate a suitable disposal arrangement. GSA would take over on July 1, and put the laboratories in standby, pending disposal.

The Administration's proposal differs from earlier legislation on disposal of synthetic rubber facilities in that no national security clause would be included in the sale contract. This feature of the bill is particularly significant because a buyer would have a free hand in dismantling and moving any or all of the facilities.

With a requirement to maintain the laboratories as is, it is felt that it would be considerably more difficult to dispose of the facilities.

Magic Acquires Peerless Cement

Magic Chemical Co. of Brockton, Mass., has announced the acquisition of the Peerless Cement Co., widely-known manufacturer of industrial adhesives. The adhesives lines of both companies are being integrated. Magic Chemical now offers a broad variety of synthetic and natural adhesives for all types of industrial applications.

New Leeds & Northrup Plant

A four-day open house, beginning on May 11, marked the opening of a new instrument manufacturing plant constructed by the Leeds & Northrup Co. at North Wales, Penna. Guests included prominent industrialists and scientists as well as employees of the company and their families. Said to be the "world's most modern instrument plant," the new facility is devoted entirely to the manufacture of "Speedomax" recorders and recorder controllers, "Metermax" combustion controls, load frequency controls, and certain other automatic instrumentation widely used by science and industry. Manufacturing operations employ standard machine tools, engravers, winding and molding machines, and such operations as heat-treating, spraying and lacquering, connecting, calibrating, testing, assembling and tool and die making. Because of the wide variety of products, it was pointed out, mass-production techniques are seldom used, but great emphasis is placed on proper sequence and arrangement of operations, efficient tooling and other measures to assure economy of production and maintenance of quality. Inspection operations are performed "in the flow of production" whereever possible.

The manufacturing and office areas are a single-story building with partial mezzanine, providing over six acres of floor space and set in a 129-acre tract. Walls are of brick and insulated metal siding, with glare-resistant windows. The flat roof is also insulated and can hold several inches of water for additional summer-time insulation and cooling. Special heating and ventilating systems are provided. A separate power plant, with a pair of 30,000 pounds per hour surface combustion boilers, provides heating and process steam at about 125 psi. In-plant communications feature three special systems, in addition to Bell telephone services. The plant includes a cafeteria which seats 400 at one time. The land and buildings cost about $4,000,000; inventory and equipment about $7,000,000 more. The North Wales plant will employ about 1,300 persons, including not only manufacturing personnel, but also personnel from engineering, industrial engineering, personnel, accounting and maintenance departments. Leeds & Northrup headquarters, and all manufacturing of laboratory instruments, furnaces and certain other products will remain at the long-established location in Philadelphia, Penna.

Dura Fischer-Tropsch Waxes

Dura Commodities Corp., 20 Vesey St., New York 7, N. Y., has now made available to American industry Fischer-Tropsch polymer waxes produced in West Germany by Krupp Kohlechemie G. m. b. H. Dura Commodities is the exclusive agent for these synthetic polymers in the United States, Canada and Mexico. The basic Fischer-Tropsch polymers, "FT-200" and "FT-300", are composed of aliphatic hydrocarbons of high molecular weight. Especially noteworthy are the exceedingly high melting point, solidification point and their unusual hardness and gloss-producing qualities. Both FT-200 and FT-300 are said to have outstanding electrical properties which cannot be matched by any other waxlike product. The use of these waxes should be investigated, Dura Commodities states, in mill stocks, as a detackifying agent, and as a mold release and lubricant. The FT polymers are said to be compatible with polyisobutylene, polyethylenes, Butyl and other rubbers presently used in the trade. Full information and samples are available from Dura Commodities.

Introduces O-Ring Lubricant

A new lubricant, "Parker O-Lube," that extends the service life of synthetic rubber O-rings, has been developed by the Parker Appliance Co., Cleveland, Ohio. The grease is applied to both the O-ring and the metal surfaces over which the O-ring must slide. The material is especially recommended for low pressure pneumatic and vacuum systems. After original assembly lubrication, additional application normally is not necessary in pneumatic systems. O-Lube, which has a temperature range of —20°F. to 400°F., is packaged in 4-ounce tubes.

Shown here is an aerial view of the new Leeds & Northrup plant at North Wales, Penna. It is said to be the "world's most modern instrument plant."

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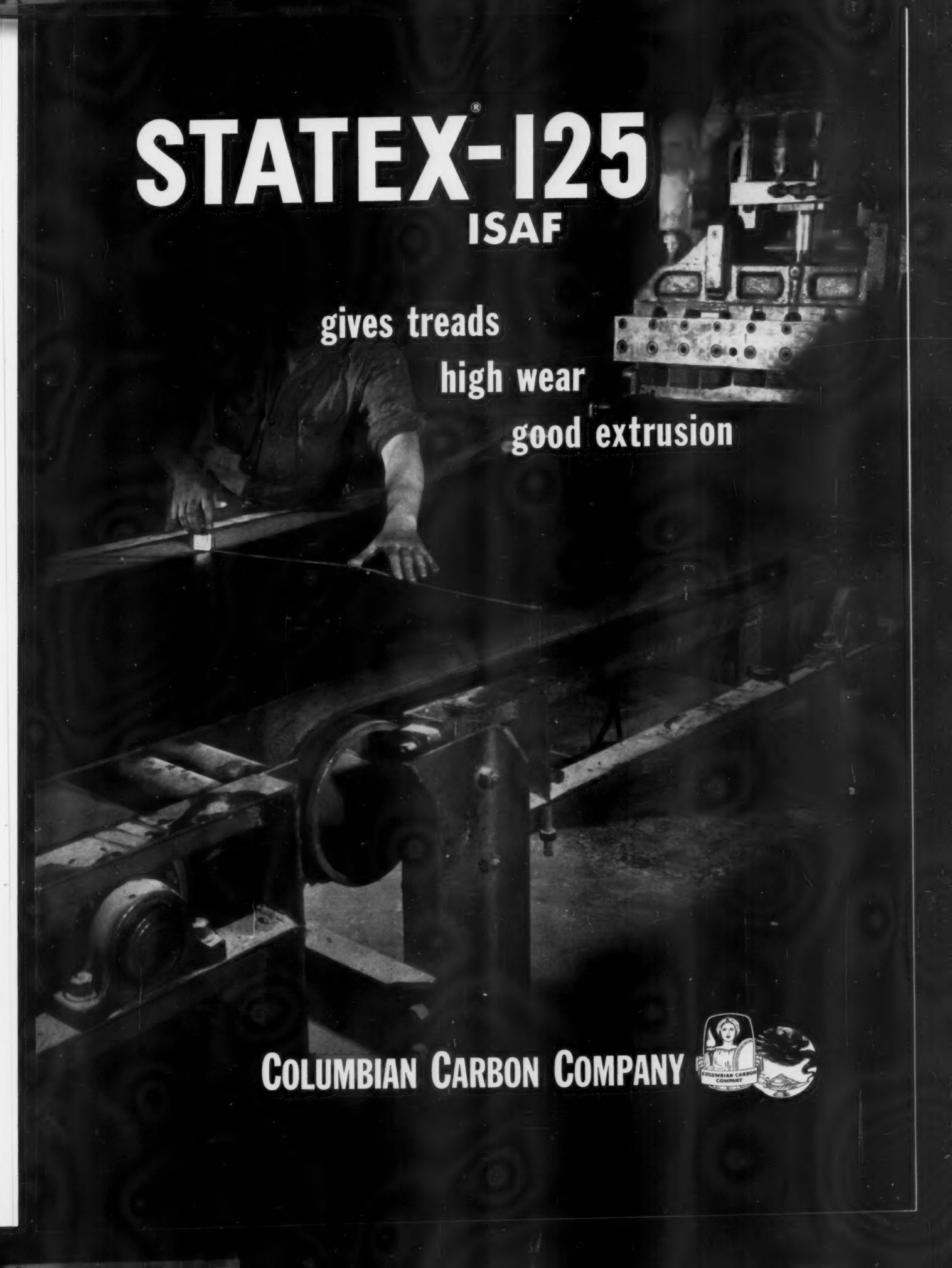

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MANAGEMENT SLATE WINS IN FIGHT FOR THERMOID CONTROL

A management slate of nine nominees was elected to the board of the Thermoid Co., at the conclusion of the annual meeting on May 1 at Trenton, N. J. The inspectors of election noted, however, that they did not check the proxies of a recently organized opposition group. Inspectors told the meeting that there were no ballots handed them covering the opposition slate, so they were not counted.

Earlier, the opposition group failed in its efforts to obtain a third recess of the meeting until May 15. When their bid for a new recess was declared defeated, a spokesman for the group walked out of the session and its list of candidates was not filed with the tellers.

The insurgents had said in proxy material they have options to buy over 96,000 shares of Thermoid stock now held by a former chairman and president, Frederic E. Schluter, and associates. Their proxy statement said the group was organized for the purpose of acquiring working control of Thermoid by acquisition of stock interests of the Schluter family. They stated the availability of such interests was first called to their attention about April 9.

Opposition Quits Meeting

In quitting the May 1 meeting, John J. Clancy, Newark attorney and spokesman for the opposition group, asserted the group had not had an equal chance to examine proxies. He asked that the Corporation Trust Co., whose representatives were the election judges, seal all the proxies.

On Mr. Clancy's motion to adjourn the meeting, James A. Lafferty, Thermoid secretary, certified "no more than 252,000 shares" favored the move. Mr. Lafferty said "more than 450,000 shares were voted against" postponement. Entitled to vote at the meeting were a total of 870,389 common and preferred shares.

Management's nominees for directors were Warren E. Hill, Hans A. Eggerss, Ray Lawson, Robert H. Robinson and Harold Youngren, incumbents, and Elton W. Clark, W. Stuart Landef, Bert W. Martin and James L. Spencer, who were new nominees. Directors not renominated by management were W. H. Allen, Herbert R. Riker and William S. Weeks.

Announced previously as the opposition's slate of directors were: Mr. Clancy; Mark Anton, president of Suburban Propane Gas Corp.; A. Harry Loprete, West Orange, N. J., Chrysler dealer; R. Gould Morehead, vice-president of Suburban Propane; Ernest Minier, president of Carterer Savings & Loan Associations, Newark, N. J.; James W. Carkner, honorary chairman of Pepsi Cola Co.; H. Victor Crawford, retired attorney; William M. Jennings, New York attorney, and John A. Couch, Jr., Newark insurance broker.

After April 29, headquarters of the M. W. Kellogg Co. will be moved to 711 Third Avenue in New York City. Until that date, the company will be located at 225 Broadway in New York City.

TWO EXECUTIVES PROMOTED BY VULCANIZED RUBBER AND PLASTICS

Robert G. Werner

David Lewis

Vulcanized Rubber and Plastics Co., New York, N. Y., has announced the election of Robert G. Werner as president of the company. Mr. Werner was vice-president and general manager of the concern. In his new capacity, he will retain the post of general manager. The company has also announced the election of David Lewis as vice-president in charge of manufacturing and sales. Prior to his election as vice-president, Mr. Lewis was director of sales for the company.

RD Library Bibliographies

The library of the Division of Rubber Chemistry of the American Chemical Society, located at the University of Akron, Akron, Ohio, has announced the publication of a group of bibliographies of interest to the industry. The first of these, Number 18 in a series, is entitled "Rubber to Metal Bonding (Excluding Brass Bonding)". No. 19 covers "Glove Dipping Techniques" and No. 20 is on the subject of "Reclaim Rubber Cements". No. 21 is entitled "Permeability of Elastomers to Water and Water Vapor" and No. 22 is on "The Permeability of Elastomers to Oxygen". No. 23 is also on the subject of permeability, this one "Permeability of Elastomers to Air". No. 24 covers the subject of "Rubber Bearings" and No. 25 concerns itself with "Diisocyanate-Polyester Compounds". Further information on the bibliographies may be obtained from the Rubber Division Library.

Elected Thermoid Vice-President

Charles M. Scholz, since July, 1955, assistant to the president of the Thermoid Co., Trenton, N. J., in a sales coordinating capacity, has been elected a vice-president. Mr. Scholz joined Thermoid in 1954 as assistant general manager of the Industrial Rubber Division. He had previously served as sales manager for the Pioneer Rubber Co., and had been active in sales and research activities for the B. F. Goodrich Co.

Another copy of RUBBER AGE needed in your office? Use the coupon on page 541.

Expanding Topeka Plant

Final plans for an addition to production facilities at the Goodyear Tire & Rubber Co. tire plant in Topeka, Kans., have been announced by Russell DeYoung, executive vice-president. Machinery to manufacture white sidewall tires, a unit to produce retread rubber, and facilities to increase huge earthmover tire production 25% are included in the expansion plans. "Approximately 300 new employes will be needed to operate the additional facilities when completed early next year," Mr. DeYoung said. New buildings of brick and steel construction will add approximately one-quarter million square feet of floor space to the plant. Production of white sidewall tires and retread or "new tread" rubber will be new to Goodyear's Topeka operations. Expansion of the Topeka plant's production facilities is part of a broad $114,000,000 expansion program now underway at Goodyear's operations throughout the world.

Adds Two Sales Representatives

Two new sales representatives, James T. Fairclough, Jr. and Robert Dudley, have been added to the Latex and Lotol Department of the Naugatuck Chemical Division of the U.S. Rubber Co., Naugatuck, Conn. Mr. Fairclough, formerly a chemist at Naugatuck Chemical's Gastonia, N. C., plant, has been assigned to the Georgia area with temporary headquarters at Gastonia. Mr. Dudley, previously a chemist in the company's latex research and development group, will make his headquarters in Philadelphia, Penna.

NEAR-RECORD ATTENDANCE MARKS CLEVELAND RUBBER DIVISION MEETING

Near-record attendance marked the 69th meeting of the Division of Rubber Chemistry of the American Chemical Society which was held at the Hotel Cleveland in Cleveland, Ohio from May 16 to 18. Official registration amounted to 1291 which is only twelve less than the peak of 1303 established at the Philadelphia meeting last fall. A total of 56 ladies also were registered at Cleveland. Although no special program was arranged for the ladies, they were invited to a number of special events and were kept fully occupied.

The Cleveland meeting featured the presentation of twenty-six papers, a luncheon meeting of the 25-Year Club, a business session, and the usual divisional banquet. Included among the papers was an invitation paper by Arnold H. Smith, retired president of the Monsanto Chemical Company of Canada, Ltd., now living in St. Louis, Mo. Mr. Smith, who was the first secretary of the Rubber Division, spoke on "The Rubber Division 1919-27 As I Remember It".

Technical Papers Presented

The technical papers were delivered at four separate sessions and were divided into four special groups: (1) New Polymers; (2) Degradation and Analysis; (3) Carbon Black; (4) Compounding and Miscellaneous. Arthur E. Juve (Goodrich), chairman of the Division, presided at the first session, B. S. Garvey, Jr. (Sharples Chemicals) at the second, D. C. Maddy (Harwick Standard) at the third, and Cecil A. Smith (N. J. Zinc) at the fourth.

The papers followed the usual gamut of rubber chemistry and technology and included data on two new butadiene-methyl-vinylpyridine general-purpose synthetic rubbers, vinyl-containing silicone gums, rubber compounds designed to withstand both the heat of jet engines and the cold of high altitudes, chemical additives that give foam rubber longer life, a chemical test so sensitive that it will detect one part of ozone in 50 million parts of air, the effects of mixing time on properties imparted to rubber by reinforcing carbon blacks, latest advances in isocyanate chemistry, and new polymers from natural rubber. Abstracts of all of the papers presented were published in our April, 1956 issue.

Arthur E. Juve

Rubber Division Chairman

Controlled-Reactivity Silicones

Of special interest were two papers on the vinyl-containing silicone gums, the first of which described a new curing system for these gums while the second covered their compounding. The first paper, given by M. L. Dunham of the Silicones Division, Union Carbide and Carbon Corp., N. Y., N.Y., emphasized the fact that blends of dimethyl silicone gums and vinyl-containing gums can be covulcanized.

According to Mr. Dunham, the system is one of "controlled reactivity". By reversing the activity of the curing system by introducing reactive, unsaturated, pendant groups in the polymer and using a relatively unreactive peroxide exhibiting specificity toward the unsaturated groups the state of cure can be reproducibly controlled by the composition of the polymer. Furthermore, the proper selection of the less reactive peroxide minimizes harmful curing residues, eliminates the need for long, step-wise oven postcures required for thick sections, and allows practical curing of stocks compounded with fillers having reactive surfaces.

A further dividend obtained with the new curing system, according to the speaker, is the unpredicted, extremely low compression set obsoleting the use of special compression set additives which in many cases are toxic and limit the elongation properties. These features are obtained without compromising other desirable properties of silicone elastomers.

The second paper on this subject, presented by J. H. Lorenz of the same company, dealt with the compounding of the vinyl-containing gums and described the properties and uses of illustrative compounds made from such "controlled reactivity" gums. Mr. Lorenz stated that new and striking advances have been made in silicone rubber technology by the development of vinyl curing systems such as demonstrated in Union Carbide W-96 controlled reactivity gum and the compounds based on this gum. He said that important new uses for silicone rubber have resulted. Rolls, high pressure steam gaskets, low set rubbers for the drug and pharmaceutical industry and conductive rubber heaters are among the first to be realized.

New Types of Synthetics

The two butadiene-methyl-vinylpyridine rubbers, under the trade names Philprene VP-15 and Philprene VP-25, have now been made available in semi-commercial quantities, according to H. E. Railsback, manager of the research compounding section of the Research and Development Dept., Phillips Chemical Co. Mr. Railsback in his report stated that "these unique rubbers have not been widely used in the past due to the tendency to scorch during processing. A simple curing system has been developed using low sulfur levels, a sulfur donor and a delayed-action-type accelerator that should give acceptable processing safety for factory mixing." Compared with conventional general-purpose synthetics, he said, the new products promise rubber parts that will carry heavier loads, have better color retention, and be more flexible at lower temperatures.

Arnold H. Smith

Division Invitation Speaker

A chemical test so sensitive that it will detect one part of ozone in fifty million parts of air was described by C. W. Wadelin of the Research Laboratory, Goodyear Tire & Rubber Co., Akron, Ohio. Dr. Wadelin, who presented his paper on Thursday morning, stated that "recent research has shown that ozone is one of the most destructive trace components in air." The speaker continued that "because the amount of ozone in air is so small, extremely sensitive analytical methods are required. The ozone from 4 or 5 cubic feet of air is absorbed in a small amount of potassium iodide solution where it can be titrated. The present research is concerned with improving the reproducibility of ozone determination by eliminating the need for a volatility correction and providing a more sensitive and point detection circuit," Dr. Wadelin declared.

Proper Mixing Procedures

The pinpointing of proper mixing procedures to achieve the desired properties in rubber for various uses—in the shortest possible time—was the objective of studies described by Dr. Isaac Drogin, vice-president for technical sales of the United Carbon Co., Inc., Charleston, West Va. Dr. Drogin in his paper, "Effects of Mixing Time on Properties Imparted to Rubber by Reinforcing Carbon Blacks," described the effects when the first-stage mix or masterbatch is Banbury-mixed for as short a time as 1½ minutes and as long as 12 minutes. He also described the effects of working the masterbatch on the sheet-off mill as long as eight minutes immediately after its discharge from the Banbury. (This paper will appear in full in a coming issue of RUBBER AGE).

Many of the high-speed aircraft our armed forces are now planning "will never progress beyond the design stage" unless

the nation's rubber technologists develop suitable new synthetic rubbers, warned Ralph M. Harper of the Aeronautical Materials Laboratory, Naval Air Experimental Station, Philadelphia, Penna. Mr. Harper, speaking on the last day of the three-day meeting, stated that there is no rubber now available that will function with jet engine lubricants above 300°F. and also be flexible at —65°F.

Polymer research chemists have not been idle, the speaker conceded. Poly FBA provides satisfactory high temperature resistance to jet engine lubricants. However, it is deficient in low temperature properties, becoming brittle in the 0 to 10°F. range. It appears, therefore, that plane builders have reached the upper limit of temperature operation of existing polymers in contact with the present synthetic lubricants—those of the "diester" type.

Smith Delivers Invitation Paper

In his invitation paper, Mr. Smith stated that the first meeting of rubber chemists that he recalled attending was in Atlantic City in June, 1918. It was part of the regular convention of the American Society of Testing Materials, and the subgroup was interested in standardizing physical and chemical testing of rubber goods, and in writing specifications for them. Mr. Smith recalled that the first meeting of rubber chemists entirely associated with the American Chemical Society which he attended was in September, 1918, in Cleveland. At that meeting he presented a paper jointly with S. W. Epstein on "The Determination of Carbon Black in Rubber Compounds."

He went on to say that in the early days "the rubber chemist from one rubber factory did not let himself be seen in public with a chemist from another rubber factory." These, along with other factors, were some of the difficulties that had to be overcome in forming a rubber technology unit, separate from other groups of the American Chemical Society. The inaugural Philadelphia meeting, September 3 to 5, 1919, attracted over a hundred people. Besides committee reports, there were some 16 technical papers presented as well as a tour through the Lee Rubber plant.

Recalls Early Days

Mr. Smith digressed from the Division momentarily to add a few comments on the rubber industry at that time. He stated that the cord tire was just coming into general use and the fabric tire, molded of square woven canvass over a cast iron core, was giving a grand mileage of some 2000 to 3000 miles. The accepted method of determining the quality of rubber, he continued, was by the "tooth and thumb" method. If your teeth were sharp, you bit a piece of the rubber to see how tough it was, then you worked with your thumbnail to get a little nick started at some practical place, and then you tried to tear the article from the nick.

Getting back to the Rubber Division, the speaker injected a note of warning when he quoted a resolution made by the Division at its meeting in New York City on September 8th and 9th, 1921. The resolution, which was directed to the Rubber Association of America, reads as follows: "It is a recognized fact that there are certain fundamental principles of general interest to the rubber industry as a whole which no single company should be expected to develop. Therefore, it is the sense of the Rubber Division of the American Chemical Society, numbering approximately 200 members from all leading companies both large and small, that a cooperative research laboratory be established under the auspices of the Rubber Association of America for furthering the investigation of such fundamental problems."

Mr. Smith stated that the industry did not heed the call. The result was almost disastrous for our country. When World War II came on, we belatedly and hurriedly repeated the German research work on synthetic rubber and got into production as fast as we could using their methods and making their products. He noted that the Akron Government Laboratories will be terminated in June, 1956, and the laboratories subsequently offered for sale. "I do not profess to know the utility of these laboratories," he continued, "but it would appear that the industry as a whole should not lightly pass by the opportunity for joint research on certain fundamental problems. We should have learned our lesson."

S. M. CADWELL TO RECEIVE CHARLES GOODYEAR MEDAL FOR 1956

Dr. Sidney M. Cadwell, director of research and development for the U. S. Rubber Co., New York, N. Y., has been chosen to receive the Charles Goodyear Medal for 1956 by the Division of Rubber Chemistry of the American Chemical Society. The medal is awarded annually to a person who has made a valuable contribution to the science of technology of rubber or related subjects. Dr. Cadwell was chosen as medalist primarily for his pioneering chemical research on agents to speed the vulcanization of rubber and to protect rubber products from the harmful effects of the atmosphere. The award will be presented at the annual meeting of the organization on September 20 at Atlantic City.

S. M. Cadwell

A holder of 69 patents for rubber inventions, Dr. Cadwell's work ranges from the first commercial rubber antioxidant to the Cadwell-Geer golf ball cover. During World War II, under his direction, a lightweight, cool-running, military truck tire made of synthetic rubber and cotton cord was developed, and he and his staff established the value of nylon cord for use in airplane tires. In 1941, the medalist personally directed the building of the first bullet-sealing fuel cells for military aircraft. Partly because of his insistence Butyl rubber was adopted for inner tubes during the war years, and chemical research done at his suggestion made Butyl truck tubes superior to natural rubber tubes. Before this time, Dr. Cadwell's research in organic chemistry produced the ultra-accelerators which helped to obtain rapid vulcanization with less than a third the previous amount of sulfur for a superior, longer lasting finished product.

Born in Bozeman, Mont., Dr. Cadwell received his B.S. degree from the University of Chicago in 1914, where he specialized in chemistry and physics. He remained at the University as a research assistant to Professor Stieglitz, receiving his Ph.D. degree in 1917. During World War I, Dr. Cadwell served as a captain with the Chemical Warfare Service. Prior to entering the service, he was employed as a research chemist for the Federal Dyestuffs Corp. Kingsport, Tenn., where he worked on the manufacture of picric acid. Dr. Cadwell began his career with the U. S. Rubber Co. in 1919 as a research chemist at its general laboratories at Passiac, N. J. Here he started his work on the problems of aging rubber, antioxidants, and accelerators of vulcanization. After 11 years of rubber and chemical research, in 1930, he was appointed director of tire development for the company with headquarters at Detroit, Mich. Dr. Cadwell came to New York in 1945 to become assistant general manager of the company's Tire Division, and in 1946, he was named director of the Research and Development Department.

Dr. Cadwell is a member of the New York Rubber Group, Rubber Division of the American Chemical Society (past chairman of the Detroit Section), the American Institute of Chemical Engineers, the Chemists Club, American Institute of Physics, American Physics Society, Society of Automotive Engineers, Industrial Research Institute, Society of Chemical Industry (American Section), a fellow of the Chemical Society of London, and he has been president of the Tire and Rim Association.

The semi-annual business meeting of the Division was held on Thursday morning, May 17, with Chairman Juve presiding. The first order of business was a minute's silence in memory of nine members who have passed away since the last meeting. These included: E. H. Grafton (Tompkins Rubber), T. E. Boyle (Goodrich International), H. V. Powers (C. P. Hall), D. F. Brown (Standard Oil Development), R. P. Cosgrove (Firestone Industrial), Ernst A. Hauser (M.I.T.), Fred W. Bommer (Acushnet Process), George Oenslager (Goodrich), and E. D. Youmans (Okonite). A brief eulogy was read by the chairman.

Nominating Committee Reports

The Nominating Committee, headed by John H. Fielding (Armstrong Rubber), as chairman, presented the following candidates for 1956-57 offices: *Chairman,* B. S. Garvey, Jr., Sharples Chemicals Division, Pennsylvania Salt Mfg. Co., Wayne, Penna.; *Vice-Chairman,* J. D. D'Ianni, Goodyear Tire & Rubber Co., Akron, Ohio and Raymond F. Dunbrook, Firestone Tire & Rubber Co., Akron, Ohio; *Secretary,* Arthur M. Neal, Elastomers Division, E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware; *Treasurer,* George E. Popp, Phillips Chemical Co., Akron, Ohio. The following members were nominated as directors from various local areas:

Akron, D. F. Behney (Harwick Standard) and K. R. Garvick (Mansfield Tire); *Boston,* T. C. Edwards (Acushnet Process) and H. W. Sutton (Boston Woven Hose); *Buffalo,* P. J. Sick (Hewitt-Robins) and R. Schutz (Buffalo Weaving); *Chicago,* J. E. A. Hopkins (Dutch Brand Division, Johns-Manville) and Vincent Labrecque (Victor Mfg.); *Fort Wayne,* H. C. Rapp (Belden Mfg.) and David Sherman (U. S. Rubber); *Los Angeles,* R. E. Bitter (Goodrich Chemical) and R. G. Luskin (Goodyear) *New York,* S. M. Martin, Jr. (Thiokol Chemical) and C. V. Lundberg (Bell Telephone Labs); *Canada,* G. R. Smye (Firestone Tire, Ltd.) and N. S. Grace (Dunlop Rubber). This is the first time that a Canadian representative has been nominated. The Executive Committee at the 1955 Fall meeting in Philadelphia approved a change in Article 4 to provide for a Canadian representative on the Board of Directors.

Cadwell Named Medalist

John Ball (Midwest Rubber Reclaiming), past chairman of the Division and current chairman of the Charles Goodyear Lecture Committee, revealed that Dr. S. M. Cadwell, director of research of the U. S. Rubber Company, has been selected as the 1956 Goodyear Medalist. Dr. Cadwell was selected out of a field of 14 nominees for his research work on accelerators and antioxidants. The new Goodyear Medalist will present the Goodyear Lecture at the Atlantic City meeting of the Division next September. The medal is awarded to outstanding technologists who have contributed substantially to the progress of rubber chemistry and technology. (EDITOR'S NOTE: A comprehensive biography of Dr. Cadwell will be found elsewhere in this issue).

B. S. Garvey, Jr.

Division Chairman-Elect

The winners of the Best Paper Award at the Fall, 1955, meeting were named during the session. These were J. D. Sutherland and J. P. McKenzie of the Copolymer Rubber & Chemical Corp., Baton Rouge, La., for their paper on "A Glass Polymerization Vessel for Small Scale Laboratory Studies". Mr. McKenzie accepted the award. (EDITOR'S NOTE: Mr. Sutherland has since organized Sutherland Reactors at Baton Rouge, La., and is currently manufacturing the polymerization vessel covered by the award winning paper).

A report by H. W. Hoerauf (U. S. Rubber), chairman of the Membership Committee, indicated that 132 new members had joined the Division since the last report. As of May 1, 1956, regular members totalled 2437 while total membership, including associate members and non-members subscribers to *Rubber Chemistry and Technology,* amounted to 3679.

It was also announced that Dr. David Craig of the Goodrich Research Center, Brecksville, Ohio, had been chosen Associated Editor for *Rubber Chemistry and Technology* to assist the present editor, Dr. C. C. Davis. Ralph Wolf (Columbia-Southern) has been appointed chairman of the Library Policy Committee and Lois Brock chairman of the Library Operating Committee. It was revealed that E. V. Osberg (National Polychemicals) has resigned as the Division historian due to business pressure. A new historian will be appointed in the near future and will possibly make a report at the Atlantic City meeting.

Divisional Banquet Attracts 650

The divisional banquet was held in the main ballroom of the Hotel Cleveland on Thursday evening, May 17, with some 650 members and guests in attendance. During the banquet the orchestra played old-time favorites with many members and guests joining in the singing. After the dinner, Chairman Juve introduced the directors and guests who were seated on the dais.

The chairman stated that something will have to be done about the large attendance at the technical sessions. He said that attendance at the papers varied from 200 to 1000 and that large attendance at such meetings was not conducive to the proper exchange of information for which these meetings were intended. The chairman suggested that a committee be formed to study the problem and perhaps find a better way to handle the technical program.

With regard to membership, the chairman stated that probable membership of the Division should reach 4,000 in 1956. He said this was a low estimate and that membership would probably be larger than that.

Mr. Juve then introduced Alden Emery, ACS secretary, who gave a brief talk. Mr. Emery stated that he always liked to attend the Rubber Division's meetings and complimented the assembled members on being one of the largest divisions in the American Chemical Society. Interesting entertainment followed.

Meeting of the 25-Year Club

The luncheon meeting of the 25-Year Club, generally the kick-off at Division meetings, was held at the Hotel Cleveland on May 26 with F. W. Stavely (Firestone) presiding as chairman. Approximately 195 members and guests were present, and it was announced that total membership in the club now amounted to 435. One of the guests present was E. W. Madge of the Dunlop Rubber Co. of England, currently on an extended visit to this country.

A moment of silence was observed in memory of several club members who passed away since the previous meeting. These included William Y. Duncan (retired), E. H. Grafton (Tompkins Rubber), E. A. Hauser (M.I.T.), George Oenslager (retired), and H. V. Powers (C. P. Hall Co.). Several new club members were introduced, including Raymond Dunbrook (Firestone), E. N. Cunningham (Precision Rubber), C. H. Peterson (U. S. Rubber Reclaiming), and E. G. Holt (Commerce Department).

The usual process of determining the oldest member present in point of service, other than those already honored by the club, was observed. Honors this time went to Albert W. Holmberg (Naugatuck Chemical) who started with the old Rubber Regenerating Co., now incorporated in the Naugatuck Chemical organization, on February 7, 1909. Mr. Holmberg received the usual money clip memento.

It was announced that the next meeting of the club will be held during the Atlantic City meeting next fall with E. R. Bridgwater (DuPont Elastomers Division) as chairman. Incidentally, membership in the club is open to all members of the rubber industry with twenty-five years of actual service. Those with this qualification who wish to join the club should write to Earl B. Busenburg, B. F. Goodrich Co., Akron, Ohio. There are no membership fees. New members wishing to secure club lapel pins should write to Owen Brown, Godfrey L. Cabot, Inc., 77 Franklin St., Boston, Mass. These pins are available through the courtesy of the Cabot organization.

Credit to Local Committee

Other than the usual difficulty with the hotel with regard to room reservations, everything went well. The Local Arrangements Committee for the Cleveland meet-

ing did an excellent job. Credit is due C. A. Smith (N. J. Zinc), general chairman of the Local Arrangements Committee, and E. B. Busenburg (Goodrich), vice-chairman, who ably assisted Mr. Smith. Chairmen of the various committees included the following:

Banquet, E. H. Krismann (DuPont); *Registration and Information,* H. Brubaker (Witco Chemical); *Finance,* W. T. Hall (C. P. Hall); *Ladies Entertainment,* B. F. Benson (Industrial Rayon); *Publicity and Printing,* George Koch (Goodrich Chemical); *Program and Meeting Rooms,* W. von Fischer (Case Institute); *Housing,* W. D. Parrish (Goodrich Chemical); *25-Year Club,* F. W. Stavely (Firestone).

The program for the ladies included a luncheon on Thursday afternoon and a coffee hour Friday morning. Information regarding points of interest in Cleveland—river cruises, sight-seeing tours, department stores, restaurants, and theatres—was made available to the ladies at the Ladies Registration Desk. During the Ladies Luncheon a questionnaire was handed out on which the lady guests were asked specific questions as to their interest in industrial plant trips, guided sight-seeing tours, sports activities and a social meeting. The questionnaire is intended for the guidance of future committees who will be responsible for the ladies' activities at the conventions.

Sets Sales Personnel Changes

Minnesota Rubber and Gasket Co., Minneapolis, Minn., has announced several changes in its sales staff. Richard K. Mattocks, formerly with the Illinois Bell Telephone Co., has been appointed to the newly created post of assistant sales manager. Robert Wilson has been promoted to district manager of the New York area, and Eugene Fischer, former chief engineer of the Drum Equipment Corp., has been named his associate. Harold Moorehead, formerly with Raybestos-Manhattan and Joseph Glenn & Son, has been named assistant district manager of the Philadelphia region, and a similar position in St. Louis has been filled by Eugene Raemdonck, previously associated with the Wagner Electric Co. The Cleveland office, under the direction of William Grotenrath, has been extended to cover Cincinnati and will be serviced by William Grotenrath, Jr. A branch of the St. Louis district office has also been established in Kansas City, supervised by Curtis Beem.

Appoints Two Vice-Presidents

Two administrative officers of the Wooster Rubber Co., Wooster, Ohio, James K. Buckwalter and Donald E. Noble, have been promoted to the position of vice-president. Mr. Buckwalter, general sales manager, becomes vice-president in charge of sales, and Mr. Noble, secretary and treasurer, becomes vice-president in charge of finance. Both men will retain their present responsibilities in addition to assuming heavier management activities. The two men join Forrest K. Shaw, vice-president in charge of production, in heading major executive divisions of the company as vice-presidents.

Stein-Hall Building New Plant

Stein, Hall & Co., Inc., New York, N.Y., has announced plans for the construction of a new $250,000 manufacturing plant, office building and laboratory at Charlotte, N.C. The new facilities will replace the firm's present Charlotte operation and will manufacture all of the resins now being made by the company in Charlotte. In addition, it will turn out Stein, Hall's complete line of liquid adhesives. The expanded facilities also will make it possible to add other company products as demand for them in the south increases and as new developments evolve from the research laboratories. Construction of the plant will begin shortly and is expected to be completed by the end of 1956. The new structure will contain 30,000 square feet of indoor manufacturing space which will be augmented by some 5,000 square feet of outdoor process installations. In addition to the increased manufacturing space, the new plant will have office space for the company's Charlotte sales branch and laboratories to facilitate increased emphasis on research and development work.

General Tire Expanding Plant

Work has been started on the first major expansion of the Ashtabula, Ohio, chemical plant of the General Tire & Rubber Co., Akron, Ohio. The Central Engineering Department is supervising the building addition and machinery installation. W. C. Lang is the project engineer. Expansion of the 18-month-old chemical installation will boost the plant's vinyl resin productive capacity by 50%, the company stated. It has been turning out vinyl resins at the rate of 25,000,000 pounds annually. Original cost of the plant was $6,000,000. P. J. Wallace, formerly production superintendent at Ashtabula, has been appointed plant manager, replacing James A. Pollock. Mr. Pollock will direct the design and construction of the company's new synthetic rubber plant to be built at Odessa, Texas.

UC Introduces New Catalyst

Silicones Division, Union Carbide and Carbon, Corp., New York, N.Y., has announced the development of a new silicone rubber curing compound, "X-1960." Commercially available in one-gallon cans, the catalyst is a stiff white paste that contains a combination of silicone rubber gum, a filler, and 5% ditertiary-butyl peroxide (DTBP), which is said to be processed so that it cannot evaporate. Shelf life is six months or more. DTBP is the recommended catalyst for the UC W-96 silicone gum stock with "controlled reactivity," which was introduced last year, and the more recent compounds in the 1000-1900 series. It is said to give lowest compression set values, allows thick-section cures without tedious stepwise post-cures, minimizes harmful catalyst residues in the rubber, and enables carbon black to be used as a reinforcing filler. It is stressed that X-1960 is recommended only for curing UC silicone rubber compounds and gums which feature controlled reactivity and is not for use with regular dimethyl silicone rubbers.

National Adds Four Directors

Four new directors representing eastern financial interests have been elected to the board of the National Rubber Machinery Co., Akron, Ohio. The new directors are E. M. Black, chairman of the board of American Seal-Kap Corp. of Delaware; Alfred R. Bachrach, New York public accountant; Samuel D. Lunt, partner in Hamlin & Lunt, Buffalo, N. Y., investment bankers; and Gilbert E. Webster, president, National Lock Washer Co. of Newark, N. J. Prior to the election, the size of the board was increased from seven to ten members. One vacancy existed on the previous board with the retirement of Thomas L. Fawick. Paul A. Frank, president, and five other members of the board were reelected. Mr. Frank and all company officers also were renamed.

Shown above are members of the Chemical Division of the Goodyear Tire & Rubber Co. who participated in a technical seminar on synthetic latex polymers at the Georgia Institute of Technology, Atlanta, Ga., on May 4. Left to right are: W. F. Gerrow, Atlanta district manager; W. C. Smith, latex and adhesives section head; C. O. McNeer, general sales manager; Dr. J. D. D'Ianni, assistant to the vice-president in charge of research and development; Herman R. Thies, general manager of the Chemical Division; E. W. Scott, sales service representative, and A. E. Polson, manager of the Plastics Department.

GOODRICH SUES U.S. RUBBER FOR INFRINGEMENT OF TUBELESS TIRE PATENTS

The first actual test of the patents the B. F. Goodrich Co., Akron, Ohio, holds relative to the production of tubeless tires started on May 9, when the company's lawsuit against the U. S. Rubber Co., New York, N. Y., opened in Federal District Court, Baltimore, Md. Goodrich filed the action on June 29, 1954, charging U. S. Rubber with infringement of patent rights. Another such suit was filed by Goodrich on May 11, 1953, in Federal District Court in Cleveland with the Firestone Tire & Rubber Co., Akron, as the defendant. No date has been scheduled for this case.

Goodrich is asking for an injunction restraining its competitor from further alleged infringements and for a "reasonable royalty" on the tubeless tires U. S. Rubber has made in the last few years. Both U. S. Rubber and Firestone deny they have infringed on the patents. Court action to date would seem to indicate that U. S. Rubber, in addition, is challenging the validity of the Goodrich patents.

The suits are the first major court actions involving patents to be filed in the tire industry in more than 20 years. Goodrich is basing its claim on a series of patents it obtained from the U. S. Patent Office on various features of its tubeless tire. The first three patents were granted in February, 1952. Since then the company has been granted nine other patents, making 12 in all. Development of a tubeless tire was disclosed by Goodrich in May, 1947, and sale of the product began in early 1948.

Firestone Delegation Present

Interested spectators as the trial opened was a six-man delegation from Firestone that included Joseph Thomas, secretary and general counsel; W. A. Fraser, chief patent counsel; Stanley Clark, patent attorney; Robert Whipple of the legal staff; A. L. Ely, Akron lawyer, and Dr. John H. Street, director of the chemical laboratories. Arthur Nellen, vice-president in charge of Research and Development for the Lee Rubber & Tire Corp., Conshohocken, Penna., also attended.

During the first day of testimony, May 9, Goodrich presented evidence by which it hopes to prove that it developed and produced the first workable tubeless tire in the history of the industry. The first Goodrich witness, W. F. Billingsley, manager of the Construction and Design Department, stated that the numerous attempts by various companies to build a practical tubeless tire were unsuccessful until the Frank Herzegh invention in the mid-40's. Mr. Herzegh is a senior tire research engineer for Goodrich. Goodrich applied for a patent on Mr. Herzegh's invention on December 14, 1946, and one was granted February 26, 1952. It is this patent which is the subject of the current suit. Two of its provisions, a specially compounded rubber inner liner for the tire and the ribs which seal it to the rim, are the points in contention.

Stephen H. Philbin, chief spokesman for Goodrich, offered as evidence copies of various tubeless tire patents granted from 1903 to 1949 over the objections of a spokesman for U. S. Rubber. Mr. Philbin sought to show that while other tubeless tires were patented none had been produced in volume until Goodrich came along with its invention.

In testimony given May 10 and 11, Goodrich's counsel reviewed U.S. Rubber's efforts to construct a workable tubeless tire. He went through each of the old patents and 111 pages of U. S. Rubber's development records. Goodrich obtained copies of its competitor's records under the rules of federal court procedure. Likewise, U. S. Rubber has copies of Goodrich's extensive development records leading up to the Herzegh invention.

Slow Development Cited

Malvin R. Mandelbaum, U. S. Rubber attorney, opened for the defense by questioning Mr. Billingsley, Goodrich's chief witness to that point. The questioning for the most part centered on the slow development of the tubeless tire by Goodrich and on whether certain parts on the tire were included in the patent under question. Under examination, Mr. Billingsley said that more than 18,000 tubeless tires were manufactured in 1948. He said there was a change in the construction of the plylock, but the plylock was not part of the invention, and, in 1948, there also was a change in the liner. Mr. Billingsley said there were several changes in the percentage of natural rubber and other ingredients in the liner.

Mr. Billingsley testified that at the time the tubeless tire was introduced the number of adjustments for customers was higher than the normal of about one percent. But he said that was because of an "unusually liberal adjustment policy" on the part of Goodrich when the tire was first marketed. He also testified there were some further changes in the make-up of the tires after production got rolling because quality was not being satisfactorily maintained.

Earlier, Mr. Billingsley testified that he visited Tulsa, Okla., in 1942 to investigate reports of the successful invention of a tubeless tire but decided production was not practical. He also cited a 1942 joint report by the rubber industry to the Office of Defense Transportation which indicated that at that time there was no successful production of tubeless tires.

Cox Describes Own Tubeless

Testifying for U. S. Rubber on May 17, John H. Cox, director of design and development of taxicab tires for Firestone, described a tubeless tire he said he had developed. The tire was patented, he said, sometime in 1950, and two modifications were made. Mr. Cox said that the tire was taken out of production for a while, and then in 1950 and 1951, such tires were made with ribs and put on Yellow Cabs in Pittsburgh on a test basis. Sealing ribs on tubeless tires are an important point stressed by Goodrich. Mr. Cox said that he found the ribs on the Firestone tires deteriorated and were "harmful and superfluous or both." The defense also introduced as an exhibit a Firestone tire taken from a Yellow Cab in Baltimore, after it had run 42,254 miles. It was shown that this particular Firestone tire did not have ribs.

Concluding the day's testimony, Dr. Arthur W. Bull, U. S. Rubber director of tire development, illustrated the process used for making a tire by using equipment to make a miniature in the courtroom.

During the second full week of trial, attorneys for U. S. Rubber attempted to show in court, by reading excerpts from a deposition by Harold Gray, chief of tire development for Goodrich, that Goodrich "got on the bandwagon" in developing a tubeless tire. Mr. Kenyon, U. S. Rubber attorney, maintained Goodrich was "perfectly satisfied" with the bead and air seal on tubeless tires being developed in November, 1942, but that Mr. Gray was concerned about diffusion of air through the tire.

On December 1, 1942, Goodrich decided to develop a more satisfactory liner to prevent diffusion of air from the tire, Mr. Kenyon said. Four days later, according to the deposition, Goodrich set up a program for testing diffusion of different materials. At about the same time Mr. Gray learned that DuPont had developed a material which might prove satisfactory as a tire liner. Mr. Kenyon said this showed Goodrich was using suggestions from outside its own company staff in the development of a liner.

British Version Presented

On May 22, a tubeless tire said to be produced on the basis of a 1930 British patent was presented to the court. The British patent was introduced to show tubeless tire development prior to Goodrich's entry into the field. Under questioning by the presiding justice, Dr. Bull admitted that the tire based on the British patent was made after the present litigation began. Dr. Bull said that four such tires were driven for about 40,000 miles and tested satisfactorily, and that he drove a car with such tires on it at speeds up to 90 mph. and that it "cornered" satisfactorily.

Earlier, under examination by a U. S. Rubber attorney, Dr. Bull said the Goodrich patent clearly described the liner of the tire as being made of Butyl. He said that such a liner would be more impermeable than liners described in several other patents but would not adhere satisfactorily to the tire carcass. Other methods of making a liner with natural rubber would adhere to the carcass but would not be as impermeable as one made of Butyl, he said.

On the following day, Dr. Bull testified to important differences between the tubeless tire U. S. Rubber now builds and the one described by Goodrich in its patent. He said his company's tire liner does not continuously cover the inner tire surface as described in the Goodrich patent, and the tire is made of a different type of rubber. Dr. Bull also stated that U. S. Rubber put ridges in the beads of all its tires, whether tubeless or not, to eliminate the "thumps," but that the ribs were no longer being used in conventional tires because another method of eliminating the "thumps" has been found. Following Dr. Bull's testimony, the suit was recessed until June 5.

ASME RUBBER DIVISION PLANS JUNE MEETING IN CLEVELAND

The Semi-Annual Meeting of the Rubber and Plastic Division of the American Society of Mechanical Engineers will be held on June 18 at the Hotel Statler in Cleveland, Ohio. As usual, the meeting will be divided into two sessions, one devoted to papers on rubber, and the other to papers on plastics. Dr. Maurice Morton (Akron University) is serving as the technical sessions chairman.

The chairman for the rubber session will be W. K. Taft (Government Laboratories), and G. L. Bruggemeier (Firestone) will serve as vice-chairman. The following papers have been scheduled for presentation at the rubber session:

"The Properties and Applications of Silicone Rubber" by Silas A. Braley, Jr., Dow Corning Corp., Midland, Mich.

"The Properties and Applications of Coral Rubber — A Cis 1,4 Polyisoprene" by Glen Alliger, J.M. Willis and W.A. Smith, Firestone Tire & Rubber Co., Akron, Ohio.

"Polyurethane Rubber as a Material of Construction for Industrial Rubber Goods Products" by G. H. Gates and W. M. Larson, Goodyear Tire & Rubber Co., Akron, Ohio.

Plastics Session Reports

Dr. Selby Skinner (Case Institute) will serve as chairman of the plastics session. The vice-chairman for this session will be William R.R. Park (Case Institute). The following papers have been scheduled for presentation at the plastics session:

"The Effect of Colorant Type and Amount on the Weather Aging Characteristics of Styrene Plastics" by R. J. Bourke, H. C. Wood and J. R. Raylor, Monsanto Chemical Co., St. Louis, Mo.

"The Properties and Applications of Marlex 50 Ethylene Polymer" by R. Vernon Jones, P. J. Boeke and M. W. Davidson, Phillips Chemical Co., Bartlesville, Okla.

"Hi Impact Plastics as Engineering Materials" by F. J. Ingley, Dow Chemical Co., Midland, Mich.

"Zytel Nylon Resin — A Versatile Engineering Material" by W. C. Warriner and A. J. Cheney, E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del.

Davis Sentence Reduced

The Federal Court in Cleveland, Ohio, has ordered a one-year reduction in the five-year prison term of Poncet Davis, president of the Robbins Tire & Rubber Co. of Tuscumbia, Ala., for income tax evasion. An Akron internist testified that Mr. Davis was suffering from a rapid and irregular circulation and frequent loss of consciousness. He added that the nervous strain and tension of prison life probably would adversely affect Mr. Davis. Mr. Davis was convicted of defrauding the government of $738,000 in income taxes. By reducing the sentence to four years, Mr. Davis will probably be eligible for parole in twenty months.

Coming Events in the Rubber Industry

June 15. Akron Rubber Group, Golf Outing, Firestone Country Club, Akron, Ohio.

June 15. Boston Rubber Group, Annual Summer Outing, Andover Country Club, Andover, Mass.

June 17-22. American Society for Testing Materials, 59th Annual Meeting, Chalfonte-Haddon Hall, Atlantic City, N. J.

June 19. Buffalo Rubber Group, Summer Outing, Lancaster Country Club, Buffalo, N. Y.

June 22. Detroit Rubber & Plastics Group, Summer Outing, Western Country Club, Detroit, Mich.

June 22. Washington Rubber Group, Summer Outing, Bethesda Country Club, Bethesda, Md.

June 26. Society of the Plastics Industry, Plastic Structures Division Conference, Hotel Roosevelt, New York, N. Y.

July 27. Chicago Rubber Group, Annual Golf Outing, Medinah Country Club, Medinah, Ill.

Aug. 2. New York Rubber Group, Golf Tournament, Innis Arden Golf Club, Old Greenwich, Conn.

Aug. 17. Philadelphia Rubber Group, Manufacturers' Golf & Country Club, Oreland, Penna.

Sept. 8. Connecticut Rubber Group, Summer Outing.

Sept. 13. No. California Rubber Group, Golf Outing, Castlewood Country Club, Pleasanton, Calif.

Sept. 19-21. Division of Rubber Chemistry, A.C.S., Chalfonte-Haddon Hall, Atlantic City, N. J.

Sept. 27. Fort Wayne Rubber & Plastics Group, Hotel Van Orman, Fort Wayne, Ind.

Sept. 28. Chicago Rubber Group.

Oct. 2. Buffalo Rubber Group, Fall Meeting.

Oct. 2. Los Angeles Rubber Group, Statler Hotel, Los Angeles, Calif.

Oct. 5. Boston Rubber Group, Fall Meeting, Hotel Somerset, Boston, Mass.

Oct. 5. Detroit Rubber & Plastics Group, Fall Meeting, Detroit-Leland Hotel, Detroit, Mich.

Oct. 5. New York Rubber Group, Henry Hudson Hotel, New York.

Oct. 10. No. California Rubber Group.

Oct. 11-12. Society of the Plastics Industry, New England Section Conference, Wentworth Hotel, Portsmouth, N. H.

Oct. 25. So. Ohio Rubber Group.

Oct. 26. Akron Rubber Group, Mayflower Hotel, Akron, Ohio.

Oct. 26. Philadelphia Rubber Group, Poor Richard Club, Philadelphia, Penna.

Nov. 2. Chicago Rubber Group.

Nov. 8. No. California Rubber Group.

Nov. 8. Rhode Island Rubber Club, Fall Meeting, Pawtucket Country Club, Pawtucket, R. I.

Nov. 14. No. California Rubber Group.

Nov. 16. Connecticut Rubber Group.

Dec. 4-5. Society of the Plastics Industry, Seventh Film, Sheeting and Coated Fabrics Division Conference, Commodore Hotel, New York City.

Dec. 5. Buffalo Rubber Group, Xmas Party.

Dec. 6. Fort Wayne Rubber & Plastics Group, Hotel Van Orman, Fort Wayne, Ind.

Dec. 7. Detroit Rubber & Plastics Group, Xmas Party, Sheraton-Cadillac Hotel, Detroit, Mich.

Dec. 7. No. California Rubber Group, Xmas Party, Orinda Country Club.

Dec. 14. Boston Rubber Group, Xmas Party, Hotel Somerset, Boston, Mass.

Dec. 14. New York Rubber Group, Xmas Party, Henry Hudson Hotel, New York, N. Y.

Dec. 15. So. Ohio Rubber Group.

Dec. 21. Chicago Rubber Group, Xmas Party, Furniture Club, Chicago, Ill.

Jan. 25, 1957. Akron Rubber Group, Mayflower Hotel, Akron, Ohio.

Jan. 25, 1957. Philadelphia Rubber Group, Poor Richard Club, Philadelphia, Penna.

May 15-17, 1957. Division of Rubber Chemistry, A.C.S., Joint Meeting with Rubber Chemistry Division of C.I.C., Sheraton-Mount Royal Hotel, Montreal, Que., Canada.

EIGHT GOOD TECHNICAL PAPERS FEATURE CIC RUBBER MEETING

Approximately 80 members and guests attended the 1956 annual meeting of the Rubber Chemistry Division of the Chemical Institute of Canada which was held at the Sheraton-Mount Royal Hotel in Montreal, Canada, on May 30th. The meeting, which featured the presentation of eight technical papers and the election of new officers for the 1956-57 period, was held in conjunction with the 39th Annual Conference of the parent society.

The new officers of the Division, following the slate presented by the Nominating Committee, which was headed by F. R. Gorrie (Cabot Carbon of Canada), are: *Chairman,* O. R. Huggenberger (Dominion Rubber); *Vice-Chairman,* H. K. Cunliffe (Mansfield Rubber of Canada); *Secretary-Treasurer,* J. A. Carr (Dunlop Canada). Directors elected include: W. H. Bechtel (Kaufman Rubber), Leo Huhta (Goodyear Tire of Canada), and E. J. Gibbon (Canadian Industries, Ltd.). This group, together with the immediate past-chairman, Gordon J. Baxter (Firestone Tire of Canada), constitutes the new Executive Committee of the Division.

Eight Papers Presented

The eight papers presented, most of them of exceptional calibre, were equally divided in morning and afternoon sessions. Although the meeting was formally opened by Mr. Baxter, the retiring chairman, the first session was presided over by John MacDonald (DuPont of Canada), chairman of the Quebec Rubber and Plastics Group, and the second by W. H. Bechtel (Kaufman Rubber), chairman of the Ontario Rubber Section.

Topics covered by the papers included behavior of rubber vulcanizates containing a variety of fillers, the properties and applications of Coral Rubber, the reaction of molecular oxygen with rubber, latest advances in tire cord, exposure cracking of sidewall compounds, applications of high intensity nuclear radiation in the rubber industry, the synthesis and polymerization of vinylidene cyanide, and the use of polyethylene in blends with cold rubber. Abstracts of all these papers appeared in our last issue and several of them will be published in full in early issues.

The full titles of the papers and their authors were as follows: *Behavior of Rubber Vulcanizates Containing a Variety of Fillers,* by B. B. Boonstra and E. M. Dannenberg, Godfrey L. Cabot, Inc., Boston, Mass.; *The Properties and Applications of Coral Rubber (A Cis-Polysioprene),* by Glen Alliger, J. M. Willis and W. A. Smith, Firestone Tire & Rubber Co., Akron, Ohio; *The Reaction of Molecular Oxygen with Rubber,* by E. M. Bevilacqua, General Laboratories, U. S. Rubber Co., Passaic, N. J.; *Tire Cord—How Tangled Can It Get?,* by R. W. Kolb, Dominion Textiles Co., Drummondville, Quebec.

Also, *Exposure Cracking of Sidewall Compounds,* by D. C. Edwards and E. B. Storey, Polymer Corporation, Ltd., Sarnia, Ontario; *Useful Aspects of the Application of High Intensity Nuclear Radiation in the Rubber Industry,* by S. D. Gehman, Goodyear Tire & Rubber Co., Akron, Ohio; *Synthesis and Polymerization of Vinylidine Cyanide — Darlan Fiber Comonomer,* by F. D. Stewart, Goodrich Research Center, Brecksville, Ohio; *Use of Polyethylene in Blends with Cold Rubber,* by P. G. Carpenter, Phillips Chemical Co., Bartlesville, Oklahoma.

Other Highlites of Meeting

Although the Rubber Chemistry Division did not hold a luncheon or dinner on its own at Montreal, most of its members and guests attended the President's Banquet which was held at the Sheraton-Mount Royal Hotel on the evening of May 30. A complimentary reception preceded the banquet and a ball followed it. Highlite of the banquet was the presentation of a light opera in one act under the title of "Research Is Most Rewarding." With words and music written by Jane and Geofferey Wright, and played and sung by members of the CIC Montreal Section, it was most entertaining and graciously received.

Dr. Clifford B. Purves was elected president of the Chemical Institute of Canada to serve for 1956-57, succeeding Dr. Roger Gaudry. E. A. Crockett, production development committee coordinator for the Polymer Corporation, was elected chairman of the board of directors. It was announced that the next meeting of the Institute will be held at the University of British Columbia in Vancouver, B. C., on June 3-5, 1957. The Rubber Chemistry Division, however, will not meet with the parent society in 1957, but will hold a joint meeting with the Division of Rubber Chemistry of the American Chemical Society. This joint meeting will be held at the Sheraton-Mount Royal Hotel in Montreal on May 3, 4 and 5, 1957.

Annual Conference Held

The exhibition which is usually held in conjunction with the CIC annual conferences attracted some 40 exhibitors this year. Among those displaying chemicals of direct interest to the rubber industry were Dow Chemical of Canada, Ltd., Naugatuck Chemicals Division of Dominion Rubber Co., Ltd., Canadian Johns-Manville Co., Ltd., W. C. Hardesty Co. of Canada, Ltd., North American Cyanamid, Ltd., Commercial Solvents Corp., Shell Oil Co. of Canada, Ltd.

"Next time don't yawn in front of a running extruder!"

BIG FIVE TO BE ASKED FOR SUBSTANTIAL RAISES BY URW

According to current reports, the United Rubber Workers, AFL-CIO, has served notice on the rubber industry's "Big Five" that it wants "substantial" pay raises for its 34,000 members in Akron plants and 61,500 in other cities. Formal wage reopening notices have gone to the Goodyear Tire & Rubber Co., Firestone Tire & Rubber Co., and the U. S. Rubber Co. Recently, notice was also served on the B. F. Goodrich Co., and the General Tire & Rubber Co. The notices provide for cancellation of contracts between the company and union if agreement is not reached on pay raises within 60 days.

No dates for the beginning of talks with any of the companies have been set. There were indications that the talks with Goodrich will start in mid-June, however. Dates and sites for the talks are set in back-and-forth correspondence between the unions and the companies. URW leaders have given no indication of the specific amount that will be asked in the wage talks.

Substantial Wage Increase

By strict interpretation, the contracts can be opened on the wage issue only. With the exception of the URW-Firestone contract, agreements with all the big rubber firms run until Spring of 1957. The Firestone agreement with the union has an October 31, 1956, run-out date. In setting the union's 1956 economic policy earlier this year, the union's International Policy Committee called for a "substantial" wage increase. The wage talks will cover 14,000 workers at Goodyear in Akron, 9,000 at Firestone, 9,000 at Goodrich and about 2,000 at General.

Nationwide, the Goodrich negotiations will cover 15,000 workers in nine plants, including Akron. Goodyear negotiations affect 23,000 in Akron and nine other cities and Firestone negotiations are with representatives in eight plants, including Akron, and for 21,500 workers. General's bargaining covers a total of 3,000 workers in Akron and Waco, Texas. The U. S. Rubber company-wide negotiations cover 20 plants and 34,000 workers.

In wage talks last Summer, settlements were negotiated among the big companies without any major strikes. The settlement pattern was set in an agreement signed by the URW with Firestone. It was followed by the other major companies.

The 1955 agreement called for a 12-cent hourly general wage increase, 8-cents hourly on top of that for raises for certain skilled and maintenance classification employes, and an additional 1-cent hourly for adjustments on "other than skilled and maintenance workers."

The agreements were also opened on other economic issues to provide improvements in holiday, jury duty pay and other fringe contract clauses. Union leaders regarded the settlement as the "best economic package" negotiated in the industry since 1946.

Want to make your opinion known? Write a letter to the editor! (See page 384).

HARVEY FIRESTONE VISITING FIRM'S EUROPEAN FACILITIES

Harvey S. Firestone, Jr., chairman of the Firestone Tire & Rubber Co., sailed on May 16 aboard the Queen Elizabeth to inspect his company's manufacturing plants in Europe. He will also attend a conference of Firestone's European production executives in Brentford, England, and the 100th anniversary celebration of the company's affiliate in West Germany.

The four-day conference was to have opened June 5 in Brentford, where Firestone has a tire and tube plant. A delegation of production and technical experts from Akron, headed by executive vice-presidents Raymond C. Firestone and J. E. Trainer, were to attend the conference with representatives of the British plant and Firestone plants in Germany, Switzerland, Spain and Sweden. The conferees were to discuss new developments and future trends in the field of tires as well as common problems and problems peculiar to the areas served by each plant. Mr. Firestone revealed that the production capacity of these plants had been increased by approximately 50% during the last two years.

Pointing out that registrations in Western Europe between 1949 and the beginning of 1955 had increased 70%, from 8,045,000 to 13,712,000, he said, "If this trend continues, we most certainly will have to expand our manufacturing facilities still further." He estimated that the world consumption of rubber would increase 52% from 2,891,000 long tons in 1955 to 4,400,000 in 1965. "If the constantly growing demand for rubber products in the United States and abroad is to be met in the future, plans to expand the production of rubber must be put into effect now," Mr. Firestone said. "We have taken several steps toward that end," he declared.

Developing Rubber Plantations

He explained that Firestone will develop rubber plantations in Brazil and the Philippines, and with others, plans to construct a synthetic rubber producing plant in England. In addition, he said, a replanting program on the 90,000 acres of Firestone's Liberian plantations will be continued to increase their yield of natural rubber.

"We are at present preparing 12,500 acres near Itubera, Brazil, for the planting of high-yielding rubber trees," he said. "And we also plan to start a rubber plantation in the Philippines where we will erect a tire plant, as we recently announced. A member of our engineering staff left earlier this week for the Philippines to do the preliminary work on these undertakings.

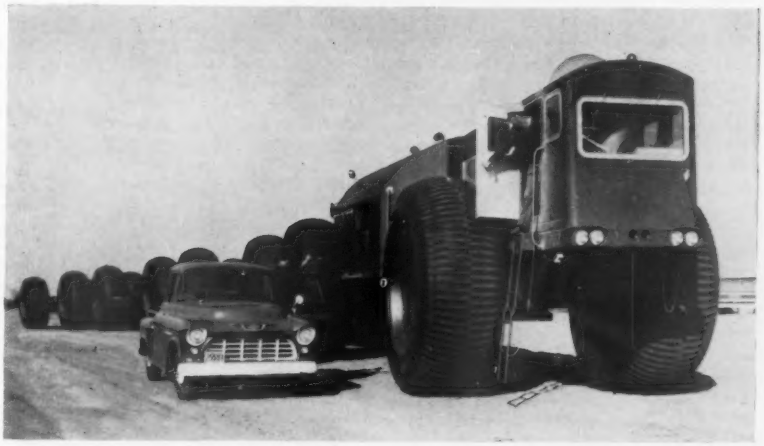
"In a joint venture with other rubber companies, we are preparing to build a synthetic rubber producing plant in England. It will have a yearly capacity to produce 40,000 to 50,000 tons. We hope to have it completed late next year.

"We have considerably expanded our domestic capacity to produce synthetic rubber since we purchased from the Government the plants at Lake Charles, La., and Akron. We are continuing to expand production capacity at these plants.

"In addition, we are preparing to manufacture at our petrochemical center near Orange, Texas, the principal constituents of synthetic rubber, styrene and butadiene, which will make our company the first in the rubber industry to produce both of these raw materials.

"Producers of natural rubber can successfully meet the joint challenge of the necessity of increasing production and the competition of synthetic rubber first by replanting with young, high-yielding stock those vast areas in the Far East which have old, low-producing trees. Second, they should expand the acreage in rubber with new plantings of high-yielding trees. Finally, they should make their operations more efficient by putting into effect every other measure that will increase the yield of producing areas and which will reduce production costs. Only on this manner will natural rubber growers continue to share in the future progress of the rubber industry."

WORLD'S LARGEST TIRES UTILIZED ON NEW LETOURNEAU SNO-TRAIN



A standard pickup truck is dwarfed by new four-unit Sno-Train, designed and built by R. G. LeTourneau, Inc., of Longview, Texas, for use by the Army Transportation corps in the Arctic. The unit has all-wheel drive, with separate electric motor tucked into the center of each individual wheel. The world's largest tires, especially made to LeTourneau specifications, are 10 feet tall, four feet wide. The new train is not the first off-road carrier to be built by LeTourneau, which specializes in the world's largest off-road transportation and materials handling equipment. It is, however, one of the most elaborate and utilizes the largest tires of any freighter the company has built thus far, the LeTourneau concern states.

DuPont Forms English Subsidiary

E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del., has announced the formation of a British subsidiary company, Du Pont Co. (United Kingdom) Ltd. The initial project of the new company will be to provide herbicides of British manufacture to the British market. The new company will also explore the possibility of future manufacture and sale of other DuPont chemical products, including neoprene, in the United Kingdom.

Have some comments to make? Write a letter to the editor! (See page 384.)

RMA O-Ring Activities

Rubber Manufacturers Association, New York, N. Y., has announced the appointment of committee chairmen who will head up the 1956 activities of the O-Ring Subdivision. T. B. Keenan (Plastic and Rubber Products) was recently elected general chairman of the O-ring group. R. W. Carlson (Minnesota Rubber) is chairman of the Industrial Standards Committee, and E. N. Cunningham (Precision Rubber Products) is chairman of the Military Standards Committee. Chairman of the Standards and Technical Committee is W. J. Johnson (Goshen Rubber). F. A. Lewis (Linear) is chairman of the Business Ethics Committee and T. A. McCuistion (Parker Appliance) heads the Membership and Publicity Committee. Typical of the work of the O-Ring Subdivision is the "Visual Inspection Guide for Rubber O-Rings" which was completed during 1955 for the Bureau of Ships and is now available as a 32-page, illustrated booklet from the Elastomer Branch of the Bureau. Comprehensive work on the determination of silicone shrinkage characteristics, which is now in progress, is another committee project regarded as potentially of considerable importance to users of O-rings.

Northern California Booklet

The Northern California Rubber Group has announced publication of a new booklet on the group for the year 1956. The booklet contains the by-laws of the group, a full meeting schedule, a membership roster and a roster of companies in the area. Further information on the booklet may be obtained from Miss Ruth Hatch, Secretary, Northern California Rubber Group, Oakland 1, Calif.

BOSTON GROUP SPRING MEETING HEARS ALLIGER AND CARPENTER

The Spring Meeting of the Boston Rubber Group was held on March 16th at the Somerset Hotel in Boston, Mass. Despite one of the worst snow storms to strike this section of New England, the afternoon technical session, which featured two papers, was attended by approximately 100 members. One paper, "The Properties and Applications of Coral Rubber — A Synthetic Cis Polyisoprene," was presented by Glen Alliger of the Firestone Tire & Rubber Co., Akron, Ohio. The other, by Dr. Paul G. Carpenter of the Phillips Petroleum Co., Bartlesville, Okla., was entitled "Recent Developments in Synthetic Rubber." The afternoon session was followed by dinner and a business meeting. After dinner, Samuel Ramsay's remarks on "The Value of a Sense of Humor in Industry" were heard by about 180 members and guests attending that portion of the meeting.

Describes Coral Rubber

In his paper, which was prepared in collaboration with J. M. Willis and W. A. Smith, Mr. Alliger stated that Coral rubber is a high molecular weight polyisoprene having the essential molecular structure of natural rubber and is prepared by lithium catalysis. As a result of this structural similarity, Coral rubber is like natural rubber in its properties. In particular, Coral rubber has the low heat build up (i.e. low hysteretic loss), the good retention of strength at elevated temperatures and the good resistance to tear and cut growth which are characteristic of natural rubber. Coral and natural rubber are similar in their reactivity to sulfur and oxygen. This similarity manifests itself in similar vulcanization and aging characteristics, he observed.

These properties of Coral rubber suggest that it should be suitable for certain tire and non-tire products for which, heretofore, natural rubber has been the only satisfactory elastomer available. On the other hand, the butadiene-styrene copolymer made at 41° F. (cold rubber or LTP) is deficient with respect to some of the above critical properties. These deficiencies make LTP unsatisfactory for certain applications, he stated.

Although Coral and natural rubber are, in general, alike in properties, they are different in certain important respects. Mr. Alliger discussed in some detail the possible effect on end product application of these similarities and differences.

In his paper on "Recent Developments in the Synthetic Rubber Field," Dr. Carpenter stated that the development of processes for the polymerization of ethylene at low pressures has led to improved types of polyethylene possessing high strength, superior resistance to heat deformation and exceptional toughness at low temperatures. Blends of Marlex 50 polyethylene, a low-pressure polyethylene developed by Phillips Petroleum Co., and synthetic rubber appear promising for applications where low heat build-up, low gas transmission and resistance to abrasion are desirable. Marlex 50 polyethylene serves as an effective reinforcing filler in either black or non-black compounds. Uses for which these blends are adaptable include shoe sole compounds, colored specialty goods and carcass or tread compounds for tires.

Philprene VP rubbers, a new group of copolymers containing 2-methyl-5-vinylpyridine as one of the monomers, are also well along in the development stage, he declared. These elastomers possess unique properties as a consequence of the pyridine nitrogen group present. When this group is reacted with quaternizing agents during the curing step, electrical conductivity and excellent oil-resistance are conferred to the compounded elastomers.

Reinforcement of the Philprene VP compounds with silica, clay and the like proceeds to a much higher degree than with butadiene-styrene copolymers. Such stocks would be valuable where light-colored conductive compounds are required as in shoe soles or floor coverings for use in hazardous areas of operation. The low heat generation for silica-reinforced Philprene VP compounds is also an important factor in utilization of these new rubbers, he concluded.

Liechty Named Chief Engineer

David H. Liechty, manager of tire engineering for Mohawk Rubber Co., Akron, Ohio, has been named chief engineer of the company's new tire and tread rubber plant at West Helena, Ark. Succeeding Mr. Liechty in the Akron plant will be W. M. Nonnamaker. In his new position, Mr. Liechty will be responsible for the installation and maintenance of all machinery and equipment and technical service for the Arkansas plant. A graduate of Case Institute of Technology in 1945, Mr. Liechty went with Mohawk a year later as plant engineer and took part in the work of expanding the Akron plant.

FIRESTONE SETS $50,000,000 SYNTHETIC EXPANSION PROGRAM

An investment of approximately $50,000,000 in synthetic rubber and petrochemical manufacturing plants in Ohio, Louisiana and Texas has been announced by Harvey S. Firestone, Jr., chairman of the Firestone Tire & Rubber Co., Akron, Ohio. The investment will cover present and projected construction to provide more than 200,000 tons of synthetic rubber a year as well as 40,000 tons of butadiene and 75,000 tons of styrene.

First expenditure in this three-year program took place in April, 1955, when Firestone purchased from the United States government two synthetic rubber producing plants in Akron, Ohio, and Lake Charles, La. These plants had a combined rated capacity of 129,600 tons per year.

Plant Expansion Cited

During the past year, these plants have been expanded by more than 50% to establish Firestone as the largest producer of synthetic rubber in the world. With its 90,000 acres of natural rubber producing plantations in Liberia, West Africa, Firestone is said to produce more rubber of all kinds than any other such enterprise.

At Orange, Texas, on a 1,000-acre industrial site, construction is getting under way on the first producing unit of Firestone's recently announced petro-chemical center. This will be a butadiene manufacturing plant which is scheduled to be completed early in 1957. A styrene plant will also be built in 1957.

Mr. Firestone stated, "By establishing its own manufacturing facilities for both styrene and butadiene, our company becomes the first in the rubber industry to produce the principal raw materials for the manufacture of its synthetic rubber."

EAGLE RUBBER ANNOUNCES PURCHASE OF ADDITIONAL FACILITIES

Eagle Rubber Co., Ashland, Ohio has announced the purchase of a two-story brick building as a part of an expansion program that began in 1952. The building, pictured above, is located next to the main plant and office building site. The new facility is a brick structure with approximately 40,000 square feet of floor space. Eagle has expanded its Ashland plant 75,000 square feet in the past three years, including the latest addition, making a total of 140,000 square feet of factory and office space. "The utilization of the newly acquired building will allow us to free other areas within our plant for production purposes," Richard E. Long, president, announced. These recent additions to facilities have been brought about by the entry into new lines of manufacturing, the Eagle Rubber president stated.

BUFFALO-ONTARIO MEETING HEARS ADDRESS BY SEAMAN

The annual International Meeting of the Buffalo Rubber Group and the Ontario Section of the Chemical Institute of Canada was held on May 11 at the Sheraton-Brock Hotel in Niagara Falls, Ont., Canada, with some 280 members and guests in attendance. Principal speaker at the meeting was R. G. Seaman, editor of *Rubber World*. Mr. Seaman spoke on "GR-S Type Rubber — Present and Possible Future Trends". The meeting began with a suppliers' cocktail hour followed by the serving of a dinner.

In his address, Mr. Seaman observed that the President's Report to Congress of April 30 on rubber emphasizes increased world dependence on synthetic rubber for the next ten years. If enough high yield natural rubber is planted and comes into production by the mid-1960's, natural rubber can hope to recover a part of the position it will have meanwhile lost. Certainly progress will also be made in the development of superior synthetic rubbers more adequate as replacements for natural rubber than present types, this Report added.

The Attorney General's Report of May 1 on competition in the synthetic rubber industry indicates that there are a number of factors favorable to the development of growth and competition in this industry, among which is the fact that there are 10 relatively strong producers of butadiene-styrene rubbers. At this juncture it would appear that no producer has achieved undue market influence. Some of the factors which may hinder the development of vigorous competition are the continuation of product specialization which existed under government ownership and the tendency towards price inflexibility.

Notes Expansion Plans

Expansion plans of GR-S type producers will provide most of the presently planned additional capacity by the end of 1957. Cold rubber use will increase at the expense of hot rubber; the use of oil-extended types, carbon black types, and oil-black types, will increase only if the quality of these masterbatches is improved, according to an independent *Rubber World* survey of 200 non-producer consumers and the four major producer-consumers, Mr. Seaman declared.

Also, *Rubber World* found that most consumers of GR-S types will base their continued use of this rubber on the price relation between natural and synthetic, except for those consumers where synthetic is preferred for technological reasons. A significant minority of consumers may stay with the GR-S type even at a somewhat higher price, however, because of the dependability of supply and the technical assistance provided by the synthetic producers, he observed.

Expansion plans of neoprene and nitrile rubber producers will take care of additional requirements of these synthetics by the end of 1957. Expansion plans of Butyl rubber producers are somewhat less definite and are dependent on the successful development of both transportation and non-transportation uses where this rubber will replace natural rubber. Expansion of capacity for the production of synthetic polyisoprene will most likely depend on its value as a strategic replacement for natural rubber and the economics of its production and use. Polyurethane rubber and foam production and use will grow as these materials demonstrate advantages over natural rubber and certain synthetics.

Finally, it may be concluded that ample supplies of new rubber will be available during the next five years and additional supplies of natural rubber should become available beginning in 1961. If our advancing standard of living supplies the demand for this new rubber, the producing and consuming industries should both enjoy a decade of unusually high business activity, the speaker opined.

Goodrich Honors Gulick

Willard C. Gulick, president of the International B. F. Goodrich Co., Akron, Ohio, was recently honored by the Goodrich organization for his thirty years of service. Mr. Gulick joined the B. F. Goodrich Co. in 1926 following his graduation

from Colgate University. He first served as a sales representative and in 1928 was transferred to export activities. During his career, he has been company general manager in Hawaii, the Philippines and in Sweden. Mr. Gulick was named general manager of the Goodrich export division in 1943 and was elected president in 1947. Mr. Gulick is seen above right as he accepted a watch presented to him by John L. Collyer, Goodrich board chairman.

Firestone Promotes Faulkner

James E. Faulkner, associated with the Firestone Tire & Rubber Co. since 1943, has been named manager of the Plantations Division in Akron, Ohio. This division is responsible for the operation of the company's plantations in Liberia, Guatemala, and Brazil. Mr. Faulkner continues in the post of assistant treasurer of the Firestone Plantations Co., a Liberian subsidiary. He is also secretary-treasurer of the United States Liberia Radio Corp. and treasurer of the United States Trading Co., two other Firestone subsidiaries. The company has also announced the appointment of Arthur C. Koenig as chief engineer of the Plantations Division. Mr. Koenig joined Firestone in 1936. He recently returned from Brazil, where the company is developing a rubber plantation.

NO. CALIFORNIA HEARS BLACK ON FORD PROCUREMENT TESTING

The May 10th meeting of the Northern California Rubber Group held at the Elks Club in Berkeley, Calif., heard an interesting address by Anthony Black, manager of the West Coast Material Quality Department at the San Jose assembly plant of the Ford Motor Co. Mr. Black spoke on "Procurement Testing in the Automotive Industry." The speaker offered a comprehensive report on the test procedures followed by Ford for purchasing acceptance.

Mr. Black stated that the Ford laboratory contains typical rubber physical testing equipment for determining hardness, tensile, elongation, modulus, abrasion and flex resistance. A weatherometer is also available for simulated aging tests, as well as an ozone box for the determination of accelerated aging and reversion characteristics of rubber compounds used in Ford parts.

This new laboratory, Mr. Black reported, is completely staffed and equipped to test automotive finishes for color match and aging characteristics. Tests are also made on metal primers for adhesion and resistance to chipping by special bend tests. Salt spray test equipment is available for testing finish resistance to corrosion.

Metallurgical Lab Available

A complete metallurgical laboratory is available for photomicrograph work and crystalography studies, along with the standard physical tests of tensile, modulus and hardness. In addition to fundamental acceptance tests and research studies, the laboratory also carries out numerous simulated end-use tests, such as spring flex tests, fatigue, torsional and high frequency vibration evaluation.

In his talk, Mr. Black also described the production of automobiles along the assembly line at the new San Jose plant. Following a discussion period, a new motion picture was shown which had to do with highway planning and safety.

Joins Sales Promotion Staff

Reeves Brothers, Inc., New York, N. Y. has appointed Langley W. Isom to its Vulcan Rubber Products Division in an administrative capacity. Mr. Isom's principal position will be to assist in the sales promotion of "Coverlight" fabrics. Prior to joining Vulcan, Mr. Isom was sales manager for the Dewey & Almy Chemical Co. and the Heveatex Corp. He is a graduate of Columbia University and received his M.S. in chemical engineering at the Massachusetts Institute of Technology.

Dumas Elected President

Directors of Emmett Machine & Manufacturing, Inc., 445 E. Turkeyfoot Lake Road, Akron, Ohio, have elected E. L. Dumas, formerly with the Parker Appliance Co., Cleveland, Ohio, as president. Mr. Dumas had served Parker Appliance as comptroller, treasurer and director. He attended the University of Pittsburgh, Duquesne University and is a graduate of the Robert Morris School of Business.

TYER RUBBER COMPANY CELEBRATING ITS ONE-HUNDREDTH ANNIVERSARY

Tyer Rubber Co., of Andover, Mass., one of the first companies to engage in the molding of rubber products in the United States, is celebrating its one-hundredth anniversary this year. Founded in 1856 by Henry George Tyer, the company still occupies the same site in Andover, although facilities have been considerably expanded. Mr. Tyer was born in England and came to this country in 1841, about two years before Charles Goodyear discovered the vulcanization process.

Shortly after arriving in America, Mr. Tyer entered the infant rubber business. He first attained prominence when, in 1852 he patented a compound of zinc oxide and rubber that produced "a beautiful and durable white rubber." Later, he and an associate patented an improvement in the manufacture of caoutchouc with carbonate or sulfate of zinc. After a trip to France in 1854 to help establish a rubber plant, Mr. Tyer returned to this country and established the North American Patent Boot and Shoe Co., in Ballardvale, Mass. The move to Andover came in 1856 when Mr. Tyer entered into a partnership with George Boyce to manufacture the "Campo," a new type of overshoe.

The first plant had six employes. Two years later twenty-five men and seventy-five girls were employed on a 10-hour shift. The company, at that time, produced 500 pairs of shoes daily. A 12 hp steam engine supplied all the power needed for thirteen stitching machines. Mr. Tyer continued to experiment with new products, and the company began manufacturing a variety of drug and medical sundries.

The company was incorporated in 1876, the Tyer family holding the stock, and Mr. Tyer held the office of president until his death in 1882. His son, Horace H. Tyer, took over active management at that time. Horace Tyer died in 1907 and was succeeded by Frederick H. Jones and then John H. Flint.

Under the management of Horace Tyer, business increased until, in 1901, 300 people were employed. The plant now occupied a two-story building with 82,000 square feet of floor space. Four salesmen were selling Tyer products throughout the country, and molded rubber specialties had now become an important part of the company's business. At this time, the molded rubber products included sporting goods. Today, Tyer makes official National Hockey League pucks, skate scabbards, single and double teeth guards, ankle supports and rubber air mattresses, in addition to a wide variety of canvas and rubber sports footwear.

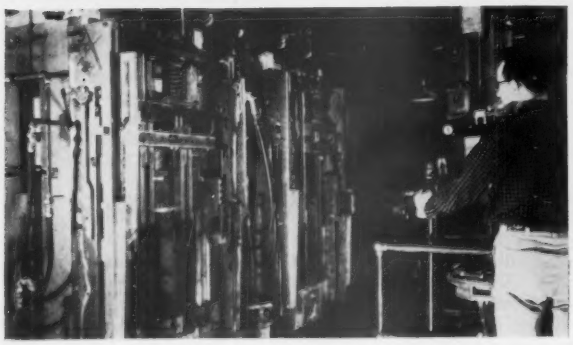
In 1909, the company entered the automobile tire and inner tube field. A new plant was erected in 1912, and the original plant became a warehouse. The manufacture of automobile tires was discontinued in 1922.

Thirty years ago, Tyer Rubber began making rubber rolls. At first the company planned to make rolls only for three important New England industries: paper, textile and leather. However, Tyer rolls now are also widely used by plastics, abrasives and packaging manufacturers.

Wallace E. Brimer
President of Tyer Rubber

Tyer has steadily expanded its roll-making facilities. Two years ago, when the company erected a new plant addition of 40,000 square feet, the entire first floor was set aside for roll making. New, specially-designed grinders and an overhead crane were installed, enabling the company to build rolls varying in size from a few ounces up to 20 tons and measuring as much as 42 inches in diameter and 25 feet in length.

Since World War II, Tyer has invested



Various production processes at Tyer Rubber's Andover, Mass., plant are shown above. The rubber roll section (upper left) produces many types of rolls for use in varied industries. A giant roll (upper right) is shown as it is being finished for delivery to a paper plant. A strapped-in mold press at the plant (lower left) assures accuracy and control in the molding of rubber products. The heater department (lower right) fabricates sandwiched wire elements for propeller de-icers.

hundreds of thousands of dollars in new equipment and processes. Production has tripled. The company now employs approximately 1,100 workers and occupies nearly 350,000 square feet in a single plant consisting of several buildings.

During World War II, in addition to the many wartime rubber products developed and manufactured, Tyer chemists and engineers developed the hot-vulcanization, under-pressure (hot cure) process of making inflatable pontoons and boats. This process proved so successful that it has become standard for many manufacturers.

Principal Products Manufactured

Although footwear continues to be the principal item of manufacture, custom molded rubber products have become an increasingly important part of the company's operations. Tyer handles the entire process—from the development of the compound to mold design and manufacture. Tyer molded products are used in nearly every field of American industry. They include aeronautical parts; parts for agricultural machinery; gaskets and grommets for air conditioning units; parts for automobiles and trucks, electronic and electrical equipment, and business machines; rubber components for household appliances and shoe machinery, and shock mountings of numerous types.

Tyer Rubber, one of the oldest manufacturers of rubber products in the United States, places due credit for its standing in the field today to its founder and early officers. In the twentieth century, the company has been fortunate in having as its executives, men who have plotted a firm path for future growth—Myron H. Clark, S. W. Bartlett (now chairman of the board), Hugh Bullock (now a director) and W. E. Brimer, the present president.

Federal Excise Tax Changes

The House Ways and Means Committee has tentatively approved recommendations for technical changes in Federal excise taxes, including tires. The committee has tentatively approved a subcommittee recommendation to levy the tax on tires and tubes at the time they leave the manufacturing plant or any warehouse within twenty miles of the plant. At present, a manufacturer with retail outlets need not pay the tax to the government until he sells the tires through his retail outlets. Independent tire dealers claim this gives an advantage to the manufacturer with retail outlets, since the independent dealers must pay the tire and tube tax when they buy them and so tie up some of their capital. The committee action is aimed at eliminating this alleged advantage.

Seamless Plans New Plant

Seamless Rubber Co., New Haven, Conn., has announced that it has received a building permit for the construction of a $25,000 one-story cinder block factory building in Holyoke, Mass. The new factory will be constructed in the Water Power Co. industrial development area in Springdale.

Houwink Receives New Post

Dr. R. Houwink

Dr. R. Houwink, formerly director general of Rubber-Stichting, Delft, Holland, has been appointed director of the Dutch Atomic Center for Industrial Applications. Born in Meppel, Holland, Dr. Houwink received his engineering degree in 1921 from the Delft Technical University. After two years as an assistant at the University, he was employed as a chemical engineer at Vredestein Rubber Factory, Holland. In 1925, he joined Philips' Radio, Eindhoven, Holland, as chief chemist and was subsequently promoted to factory manager of the Plastics Department. Dr. Houwink earned his Ph.D. degree, cum laude, at the Delft Technical University in 1937, and, in 1939, he joined Rubber-Stichting as director general.

Dr. Houwink has written numerous books and articles, some of which have been translated into German, Italian, Spanish and Polish. He has also lectured in various European countries and the United States. In addition, Dr. Houwink is president of the Division of Plastics and High Polymers of the International Union of Pure and Applied Chemistry, president of the Netherlands Society for the Knowledge of Materials, member of the Advisory Board Plastics Institute (Delft), extraordinary member of the Governmental Patent Office (The Hague), external lecturer at the Delft Technical University on chemistry and technology of high polymers, member of the International Education Committee of the Licentiateship of the Institution of the Rubber Industry Graduates (London), and president of the Central Committee for Presentation and Publication.

Plans Rumanian Rubber Plant

As part of its current Five-Year Plan, the Rumanian government has announced that it will build a new synthetic rubber factory near Bucharest. It is estimated that the annual output will be 10,000 tons, which will eventually be boosted to 50,000 tons. The combine will use machinery imported from East Germany, Czechoslovakia, and the Union of Soviet Socialist Republics.

Jones Named Personnel Advisor

Dr. Webster N. Jones, formerly Dean of Engineering and Science and presently vice-president of the Carnegie Institute of Technology, will join the Pittsburgh Plate Glass Co., Pittsburgh, Penna., at the end of the academic year on June 1, 1956. He will be associated with the corporation's Industrial Relations Department as advisor on the selection and training of professional personnel. In addition to his advisory capacity concerning professional personnel, Dr. Jones will also serve in a counseling capacity on relations between the company and educational institutions, recruiting and selection, indoctrination and training, and the evaluation of universities for further training of company executives. Dr. Jones received his B.S. and M.S. degrees from the University of Missouri, a Ph.D. from Harvard, an Honorary Doctor of Engineering from Stevens Institute and an Honorary Doctor of Laws from Norwich University. He taught chemistry at the Universities of Maine, Missouri, Montana, Purdue University, and Radcliff College. Prior to his association with the Carnegie Institute of Technology, which he joined in 1932 as Dean of Engineering and Science, he managed the general chemistry laboratories of the B. F. Goodrich Co., Akron, Ohio, for eight years.

Richardson Forms English Firm

Richardson Scale Co., Clifton, N. J., has announced the formation of the Richardson Scale Co., Ltd. at Nottingham, England, to manufacture and market Richardson automatic scales and proportioning equipment. The new company will handle the sale of Richardson scales in the United Kingdom, the Commonwealth nations and the Sterling area. It will make all types of Richardson automatic bagging, weighing, proportioning, feeding and other equipment, except Richardson Select-O-Weigh systems. The latter will still be handled in England by Henry Simon, Ltd., Stockport. The new firm's managing director is J. E. Dewstow, who has been associated with the materials handling industry for the past 25 years. T. A. Shore, formerly an engineer for Richard Simon, Ltd., British scale manufacturer, has been appointed technical director.

Haley Named to New Post

E. Wayne Haley has been appointed assistant to the president of the Columbia-Southern Chemical Corp., Pittsburgh, Penna., a wholly owned subsidiary of the Pittsburgh Plate Glass Co. Mr. Haley has also been elected a vice-president and director of the Pittsburgh Plate Glass Export Corp. He will have charge of the exportation of chemicals through either Columbia-Southern or Pittsburgh Plate Glass Export Corp., as well as handle other special assignments, in the New York office. Mr. Haley has been associated with Columbia-Southern in an executive sales capacity since 1934, having formerly served as director of sales and, during the past three years, as assistant to the vice-president

Disogrin Polyester Elastomer

Greer Hydraulics, Inc., Jamaica, L. I., N. Y., has announced the formation of Greer Industries, Inc., at the same address, for the manufacture and marketing of a new diisocyanate polyester elastomer called "Disogrin." The new material belongs to the same chemical family as Vulkollan. Disogrin is an interlaced poly addition product taken of both a polyester and a diisocyanate. It can be manufactured in many combinations, each having varied properties.

Greer Industries reports that Disogrin has unusually high tensile properties, extreme abrasion resistance characteristics, as well as resistance to aging and high ozone concentrations, to oil and jet fuels, and to radioactivity, all of which have been known to cause rapid deterioration of gaskets, seals, O-rings and bladders made of conventional materials.

Two basic types of Disogrin are presently being manufactured: compression-injection molded and liquid cast. The liquid casting method permits molding at lower cost a variety of shapes not possible by the compression method (injection, transfer, and/or extrusion). Disogrin also allows using more intricate cores. Rods and solid pieces may be cast and samples machined avoiding unnecessary delays and costs in making molds until the final stage of production is reached.

Disogrin is flame-retardant and has excellent aging properties, Greer Industries states. Its resistance to oils having less than 90% aromatics is extremely good. Sunlight causes darkening of the material without affecting any of its properties. The product has high ozone resistance and low loss factor at high frequencies. At low temperatures, Disogrin hardens without becoming brittle. High temperature applications are generally satisfactory except in the presence of steam and hot water above 200° F.

Greer Industries points out that Disogrin may be bonded to metals by special processes. The best adhesion is obtained by molding or casting directly on the metal part. Where necessary, Disogrin parts may be reinforced with fabric.

Jacques Mercier has been appointed products manager of Greer Industries. Mr. Mercier has been associated with Greer Hydraulics since 1952, serving as assistant to the president. Before joining Greer, Mr. Mercier was associated with the General Electric Co.

British Consultant Visiting N.Y.

Ronald Fisher Mawrey, special technical representative of Reckitt & Colman (Overseas) Ltd., has arrived in New York City to consult with Whittaker, Clark & Daniels, Inc., for one month. Mr. Mawrey will advise Whittaker, Clark & Daniels sales representatives on the chemical and physical properties of Reckitt's Ultramarine Blues. This technical program is expected to embrace direct calls on Whittaker customers with individual members of the Whittaker sales organization. Whittaker is the sole distributor in the United States for Reckitt's Ultramarine Blues.

Stapleton Elected President

Stowe-Woodward, Inc., Newton, Mass., has announced the election of David W. Stapleton, executive vice-president since 1954, as president. Mr. Stapleton succeeds E. W. Peterson who will assume the duties of chairman of the board of directors. In

D. W. Stapleton (right), the new Stowe-Woodward president, succeeds E. W. Peterson (left).

making the announcement, a Stowe-Woodward spokesman stated that this new appointment was the culmination of long-range plans designed to insure continued capable management of the business while providing Mr. Peterson with more time to devote to policies attendant upon the rapid growth of the company.

McCrackin Joins Mobay Chemical

J. William McCrackin, formerly a general manufacturing superintendent at the John J. Queeny plant of the Monsanto Chemical Co., has joined the Mobay Chemical Co., St. Louis, Mo., as a technical service representative. In his initial assignment, Mr. McCrackin will work with the customer service group in the research and demonstration laboratories. Mr. McCrackin received his B.S. degree in chemical engineering from Washington University in 1936. In that same year, he joined the Monsanto Chemical Co. as an analytical chemist and became an operating supervisor in 1939. In 1942, he moved to the Longhorn Ordnance Works, Marshall, Texas, where he served as area supervisor for two years, rejoining Monsanto in 1944. He was appointed general manufacturing superintendent at Monsanto in April, 1946.

Elected Brown Rubber President

George Leach has been elected president of the Brown Rubber Co., Inc., Lafayette, Ind., succeeding the late E. A. Callanan. Mr. Leach has been with the company since 1936 and, for the last four years, has been its executive vice-president. He was in automotive sales in Kenosha, Wisc., for five and one-half years. Mr. Leach attended Wabash College for two years. The board of directors also has elected W. H. Hippensteel, sales manager, as a director to serve the unexpired term of Mr. Callanan.

Nylon Custom Super Cushion

What is said to be an entirely new concept in tire design is embodied in a new 3-T "Nylon Custom Super-Cushion" tubeless tire announced by the Goodyear Tire and Rubber Co., Akron, Ohio. Designed to meet the increasing performance demands of modern cars, the latest tubeless tire by Goodyear features greater traction, a stronger, more flexible body, plus a clean, fresh design in keeping with the free flow lines of the newer automobiles. Safety-styled with deep twin-grip treads that give up to 24% more traction, the tire's broad riding ribs are formed of snugly-nested alternatingly-angled tread blocks. Designed to put more than 460 of 3800 traction-edge inches against the road at all times, the tread gives the driver improved forward traction, more grip and skid resistance, greater flexibility over bumpy areas and a quieter ride. The company's exclusive triple-tempering process which involves the precision control of tension, time and temperature "sets" nylon cord at its point of maximum resiliency and strength. This cord, when fused with the tire's inner body, bead, sidewalls and tread, as part of the Grip-Seal construction, forms the tire into a single, strong, integrated unit. This bonded strength grips around puncturing objects to minimize air loss, Goodyear states.

Introduces Super Fleetmaster

Virtual elimination of groove cracking and greatly increased resistance to side slippage are outstanding features of a new off-the-road tire announced by U. S. Rubber Co., New York, N. Y. The tire, called the "Super Fleetmaster," is designed particularly for use on dump trucks and other heavy service equipment used in logging, mining, quarrying and road construction work. Excellent steering is claimed for the tire because of its center control rib in the three-rib design. This results in better control and stability on turns. The Super Fleetmaster was specially designed for use on front, driving, and trailing wheels in any off-the-road service. Non-directional lugs permit the tire to be used on any wheel without sacrificing wearing qualities. Deep vents and more flexible lugs in the shoulder area give a cooler running tire, thus increasing resistance to separation. The new tire has excellent resistance to cutting and chipping, according to H. W. Dodenhoff, U. S. truck tire sales manager, and more uniform tread wear is obtained through the use of the modern flat tread profile and continous ribs. The Super Fleetmaster with a nylon cord body is being made in sizes from 12.00-24 with a 16-ply rating through 16.00-25 with a 24-ply rating.

Cohen Appointed Sales Manager

Glyco Products Co., Inc., New York, N. Y., has announced the appointment of Samuel Cohen as its sales manager. Mr. Cohen received his B.S. degree from the College of the City of New York and his master's degree in chemistry from New York University. He spent 12 years in the research laboratory, in the plant, and in the Sales Department of the company.

Kelly Joins Firestone

E. Dorrance Kelly

E. Dorrance Kelly, who was director of the Office of Synthetic Rubber of the Federal Facilities Corp. from 1952 to 1955, has joined the staff of the Synthetic Rubber and Latex Division of the Firestone Tire & Rubber Co., Akron, Ohio. Mr. Kelly will handle special assignments relating to production and distribution of synthetic rubber. His most recent association has been with a firm of consulting engineers in Washington. Mr. Kelly was graduated in 1934 from the University of Maryland, where his major was mechanical engineering. Before World War II, he was an engineer with a baking company. From 1941 to 1946, Mr. Kelly held various government positions including deputy directorship of the Rubber Bureau of the War Production Board. After two years in private industry, Mr. Kelly joined the Economic Cooperation Administration and at the outbreak of hostilities in Korea was selected to be director of the Rubber Division of the National Production Authority. In August, 1952, he took the Federal Facilities Corp. post, directing production and sales of synthetic rubber for the 27 government-owned plants.

Yale Rubber Expanding Plant

E. H. Henderson, president and general manager of the Yale Rubber Manufacturing Co., Sandusky, Mich., has announced that construction has been started on an additional 30,000 square feet of manufacturing space at the Sandusky plant. This addition was necessary to accommodate increased activities at the Oil Seal Division and in other rubber to metal specialties. Mr. Henderson also stated that contracts had been let for a complete sprinkler system for the entire plant and an additional 100,000 gallon water tower. Yale Rubber manufactures a complete line of molded and extruded rubber goods in addition to its line of oil seals. This added expansion brings the total manufacturing area to 140,000 square feet.

Parker Appliance Co., Cleveland, Ohio, has reported that its synthetic rubber O-ring compound "612-45" has achieved satisfactory results in JP-4 fuel after 70 hours at 350°F. and in MIL-L-7808B fuel after 70 hours at 400°F.

Producing Rubber Vacuum Bags

Quaker Rubber Division, H. K. Porter Co., Philadelphia, Penna., has announced the development of molded rubber blankets or bags of virtually any contour for use in the vacuum molding of any reinforced plastic laminates. The vacuum bag can be preformed on the mold by applying vacuum and curing at low temperatures. The bag is cured right on the mold and is ready for use in a fraction of the time formerly required. A special stock of high-grade rubber is used that ordinarily is expensive, but curing at low temperatures and long life keeps the ultimated cost low. In addition, it is claimed that the bags will withstand temperatures up to 240 or 250°F. In case of a tear, the bag can be repaired with patches similar to those used in repairing innertubes right on the job. The new Quaker process also assures a smooth finish on the laminates because the rubber fuses itself into one mass while it is being cured. The new method will enable many plastic manufacturers to vacuum draw their products in a mold, instead of pressure forming them. To make bags by this method, Quaker Rubber asks that the specific mold be shipped to Philadelphia for perfect alignment. Where this is not practical, Quaker engineers will do the job at the customer's location.

Research Chemists Join Hooker

Dr. Alan A. Weinberg and Bruce N. Wilson, research chemists, have joined the Research and Development Department of the plastics laboratory of the Hooker Electrochemical Co., Niagara Falls, N. Y. Dr. Weinberg received a bachelor of chemical engineering degree from the Case Institute of Technology in 1949, and in 1956 received his Ph.D. in organic chemistry from Ohio State University. He was a senior engineer at Strong, Cobb & Co., Cleveland, Ohio, from 1949 to 1952. Mr. Wilson earned a B.S. degree in chemistry in 1942 from St. Louis University. Since 1954, he has worked in the Analytical Development Department at the Niagara Falls plant of Olin-Mathieson Chemical Corp.

Plan English Synthetic Plant

In a joint venture with two European companies, the Firestone Tire & Rubber Co., Akron, Ohio, and the Goodyear Tire & Rubber Co., Akron, have announced plans to build a synthetic rubber-producing plant with a yearly capacity of 40,000 to 50,000 tons near Southampton, England. The new plant will be owned by the International Synthetic Rubber Co., Ltd. Dunlop Rubber Co., Ltd., of England, and Cie Generale des Etablissements Michelin, of France, are the two European companies cooperating in the joint venture. The plant is expected to be completed late next year.

Appoints Sales Representative

Rhodia, Inc., New York, N. Y., has appointed the Klenzade Products Co., Beloit, Wisc., as sales and service representative for its line of "Alamask" industrial reodorants in the central states. Klenzade Products specializes in pollution control chemicals for many industrial operations.

Seiberling Promotes Schrank

Harry P. Schrank

Harry P. Schrank, vice-president in charge of production for the Seiberling Rubber Co., Akron, Ohio, since 1936, has been elected executive vice-president. Mr. Schrank will function as chief administrative officer. He joined the company in 1926 after attending the University of Akron. Mr. Schrank was a tire designer, foreign plant specialist, and factory superintendent before becoming vice-president in charge of production. He is also vice-president and director of Copolymer Rubber & Chemical Corp., Baton Rouge, La., and vice-president of the board of the University of Akron. No successor for Mr. Schrank was elected. J. P. Seiberling, president, has announced that Frank Kovacs, assistant to Mr. Schrank, will function as production division head. A 15-man board, picked by stockholders at the firm's annual meeting following a five-week proxy contest, re-elected all other officers.

To Build Polyurethane Plant

Hewitt-Robbins, Inc., Stamford, Conn., has announced that it will establish a new 100,000-square-foot plant in Franklin, N. J., to manufacture polyurethane foam. The company has been conducting research on polyurethane since 1952 and is currently operating a temporary plant at Long Valley, N. J. The Franklin plant, scheduled to be completed on September 1, will have an annual production capacity of two million pounds. The floor area will accommodate additional machinery, to be added as demand rises. This will be the company's ninth plant. Hewitt-Robbins will manufacture polyurethane under licenses from both DuPont and the Mobay Chemical Co. and will, at first, concentrate on the flexible types.

Wire And Cables Standards

Underwriters' Laboratories, Inc. has issued the fifth edition of the "Standard for Rubber-Covered Wires and Cables." This edition is a consolidation of all the Laboratories' requirements now in effect. The March 24, 1952 Emergency Requirement and other requirements covered by bulletins issued subsequently have been either rescinded or, where necessary, modified for inclusion in the new edition.

CENSUS BUREAU RELEASES REPORT ON RUBBER RECLAIMING IN U.S.

During 1954, manufacturers of reclaimed rubber shipped products valued at $39,000,000, an increase of 124% over 1947, according to preliminary results obtained from the 1954 Census of Manufactures conducted by the Bureau of the Census, Department of Commerce. Average employment in this segment of the rubber industry has increased 38% since 1947 (when the last Census of Manufactures was taken) to a total of 2,900 employees in 1954. Value added by manufacture in the industry amounted to $22,000,000 in 1954, an increase of 128% over 1947.

"Value added" is derived by subtracting the cost of materials, etc., from the value of shipments. It avoids, therefore, the duplication in the value of shipments which results from the use of products of some establishments as materials by others and is the best measure available for comparing the relative economic importance of manufacturing among industries and geographic areas.

The reclaimed rubber segment, the Census Bureau explains, represents manufacturing establishments engaged primarily in reclaiming rubber from used tires, scrap and miscellaneous waste rubber. Establishments primarily engaged in the assembly and wholesale sale of scrap rubber, but not engaged in manufacturing reclaimed rubber, are classified in trade industries. The industry classification for reclaimed rubber used in the 1954 Census of Manufactures is based on the *Standard Industrial Classification Manual, Volume I, Manufacturing Industries*, 1945 edition.

Value of Shipments Reported

The value of shipments, as reported by establishments classified in the reclaimed rubber segment, consisted not only of products described as primary to the industry, but also included the value of secondary products (which are primary to other industries). The $39,000,000 total value of shipments reported by establishments classified in Industry 3031, Reclaimed Rubber, consisted of $38,000,000 manufactured products and $1,000,000 miscellaneous receipts for contract work.

The $38,000,000 product shipments were accounted for by $33,000,000 of reclaimed rubber (products primary to the industry) and $5,000,000 of products primary to other industries (e.g., miscellaneous rubber products and reclaimed plastics materials). Thus, the industry's shipments of reclaimed rubber represented 87% of its total manufactured products shipments (primary and secondary). This figure describes the "primary product specialization ratio," that is, the extent to which plants classified in an industry "specialize" in making products regarded as primary to the industry. The 1947 primary product specialization ratio for the industry was 95.

The industry's total value of shipments should be clearly distinguished from the total value of primary products of the industry shipped by all producers. The latter figure indicates that $45,000,000 of reclaimed rubber (products primary to Industry 3031) were shipped by all producers. Of this total, 73% was shipped by plants classified in Industry 3031, while the remainder was shipped as secondary products by plants classified in other industries. The figure 73% is known as the "coverage ratio," that is, it measures the extent to which all shipments of primary products of an industry are "covered" by plants classified in that industry, as distinguished from secondary producers elsewhere.

In 1947, only 44% of reclaimed rubber shipped by all industries was shipped by plants classified in Industry 3031. Based on quantities produced, establishments classified in Industry 3031 produced about 67% of the 1954 total, whereas the comparable percentage for 1947 is 35%. The increase in the "primary product specialization ratio" between the two years is due principally to the method of reporting by a number of plants engaged in producing, at the same location, reclaimed rubber and other products principally classified either in Industries 3011, Tires and Tubes, and 3099, Rubber Industries, Not Elsewhere Classified.

Changed Reporting Pattern Noted

For 1954, these reclaiming activities were reported as separate establishments, whereas the 1947 reports submitted covered both reclaimed rubber and products classified in other industries. This change in reporting pattern by some companies accounts for a substantial portion of the increase between 1947 and 1954 in employment and shipments for the industry.

The general statistics (employment, payrolls, cost of materials, value of shipments, etc.) are reported for each establishment as a whole. Aggregates of such data for an industry reflect not only the primary activities of the establishments in that industry, but also their activities in the manufacture of secondary products and receipts for their other activities (contract work on materials owned by others, repair work, etc.) This fact should be taken into account in comparing industry statistics with product statistics which show the shipments by all producers of the primary products of the industry.

Detailed Figures Scheduled

More detailed figures for this segment will appear later in the Census Bulletin, MC-30A, "Rubber Products," which will be published and offered for sale at a later date by the Superintendent of Documents, U. S. Government Printing Office. Also, in this bulletin, there will be a comprehensive discussion of such concepts as "industry," "establishment," "secondary production," as well as the various statistical items such as "employment," and "value added." Similar advance reports and final bulletins will be issued for other industries during the coming months.

New "Urbanite" circular pools, which are lined with Krene, have been made available for distribution by Urb Products Corp., Brooklyn, N. Y. Sizes range from 6-10 feet; 15-27 inches deep.

Thomas Named Vice-President

C. F. Thomas

G. H. Lanier, Jr., president of Turner Halsey Co., New York, N. Y., has announced the appointment of C. F. Thomas to the post of vice-president. Mr. Thomas, divisional manager of the Industrial Fabrics Department, will be in charge of sales to the rubber industry, to plastic laminators and to industrial users of synthetic fabrics.

Litzler Technical Literature

C. A. Litzler Co., 11621 Detroit Ave., Cleveland 2, Ohio, has announced the availability of several different pieces of technical literature which describe the equipment designed and manufactured by the company. Many of the items are reprints of technical articles which have appeared from time-to-time in technical publications. The following pieces of technical literature are now available:

"Continuous Processing Systems for the Rubber and Plastics Industries".

"The Latexing and Hot-Stretching of Tire Cord Fabrics With Special Emphasis on Nylon".

"Surface Coating and Impregnation of Fabric".

"The Handling of Webs and Monofilaments".

"Continuous Automatic Processing Equipment".

"The Design of Industrial Ovens With Special Reference to Safety".

"The Heating of Fluid Tanks by Convection".

"Continuous Surface Coating and Impregnating Equipment for Electric Insulated Wire and Continuous Strand Material".

"Solution Coating of Copper Wire".

"The Nylon Coating of Wire".

"Lacquering of Insulated Wire and Cable".

"Some Developments in Nylon and Polyethylene Wire Extrusion".

Ethyl Enters Plastics Field

Ethyl Corp., New York, N. Y., has awarded a contract to the Catalytic Construction Co., Philadelphia, Penna., for the construction of a plant at Baton Rouge, La., for the manufacture of vinyl chloride monomer. The new plant, scheduled for completion in the second half of 1957, will mark Ethyl's entrance into that field.

Goodrich Promotes Stevens

Harry N. Stevens

Harry N. Stevens, with the B.F. Goodrich Co., Akron, Ohio, since 1935, has been named director of research operating. Mr. Stevens, who had been research coordinator at the Research Center, Brecksville, Ohio, joined Goodrich as a chemist in its Akron, Ohio, works laboratories. He became a patent chemist in 1937, a patent attorney in 1940, and was made director of patents and abstracts in 1942. In 1950, he became head of biochemical research and two years later added the duties of head of colloid and textile research. Mr. Stevens is a graduate of Sheffield Scientific School, Yale University and Akron Law School. In 1944, he attended advanced management training courses at Harvard University.

Two Given Litchfield Award

Goodyear Tire & Rubber Co., Akron, Ohio, has awarded the firm's P.W. and Florence B. Litchfield Special Award of Merit to Alan G. Buckley, assistant manager of construction in the engineering division, and Theodore A. Johnson, section head in compound development. Mr. Buckley, who has served in Java, Brazil, Malaya and Luxembourg during his 28 years with Goodyear, suggested that live steam be introduced into the stock direct in the old-style devulcanizers in the reclaim plant. Lower costs and better reclaim quality resulted, and the old devulcanizers could be continued in service for two years longer than was possible under any other method. Mr. Johnson, who has 45 years continuous service, suggested a much shorter process in rubber reclaiming. His idea eliminated a number of milling and straining operations. A veteran in rubber reclaim developments, he has 31 years in this capacity and has held his present position since 1946.

Plans Butadiene Expansion

Humble Oil and Refining Co., Houston, Texas, has announced plans to increase the capacity of its butadiene plant at Baytown, Texas, by about one third, to 65,000 tons a year. Construction will begin in June, with completion scheduled early next year. Cost of the expansion was not announced.

Named Technical Representative

Bernhard Larsen has been appointed rubber chemicals and synthetic rubber technical representative in the Akron, Ohio, area for the Naugatuck Chemical Division, U. S. Rubber Co., Naugatuck, Conn. Mr. Larsen replaces E. H. Nahm, who retired from Naugatuck Chemical after 29 years' service. For the past year, Mr. Larsen has been a rubber chemicals and synthetic rubber technical service representative for Naugatuck Chemical in Akron. He joined the company's Research and Development Department in 1950 and in 1955 was assigned to Akron. He had previously been employed in development and production posts for three other rubber companies between 1926, when he graduated from Gettysburg College with a B.S. degree in chemistry, and 1950.

Mr. Nahm, a well-known figure in the rubber industry, joined Naugatuck Chemical in 1927 and was immediately assigned to the Akron area to sell rubber chemicals. He was previously with the R & H Chemical Co., New York, N.Y., and prior to that he was factory manager for Ideal Tire and Rubber Co. of Cleveland, Ohio.

Plans Philippine Tire Plant

Plans for the construction of a $5,300,000 tire and tube manufacturing plant in the Philippines and the development of a rubber plantation there have been announced by the Firestone Tire & Rubber Co., Akron Ohio. The Philippine plant will be the fourteenth foreign plant operated by Firestone. The plant will be located in the Manila area and will have approximately 115,000 square feet of floor space. It will be equipped to produce 100,000 passenger car and truck tires annually, the company stated. Present plans also call for the establishment of a 1,000-acre rubber plantation. Under the corporate title of Firestone Tire & Rubber Co. of the Philippines, the plant will be able to meet the tire needs of local automobile assembly plants and Filipino motorists.

Goodyear Promotes Usher

D. K. Usher, formerly assistant manager of the Airfoam Division of the Goodyear Tire & Rubber Co., has been named manager of the Sales Division-Foam Products. The name of the Airfoam Division was recently changed to the Sales Division —Foam Products. In line with his new duties, Mr. Usher announced a realignment of key posts within the Sales Division. The changes include the appointment of K. J. Learey to assistant manager; J. B. Emack, Jr., to manager of field sales; Thomas Kerr, Jr., to manager of eastern field sales; D. E. Oakes to manager of western field sales; W. M. Hunter to manager of central field sales; and J. B. Wiland to manager of the Akron office section.

"Resins for Surface Coatings," a new technical publication released by Bakelite, contains information on properties, formulation and uses of a new series of epoxy resins developed specifically for corrosion-resistant surface coatings. Ask for Technical Releases Nos. 15 and 16.

Dixon Joins Cornish Wire

John G. Dixon, Jr.

John G. Dixon, Jr., formerly associated with the Anaconda Wire & Cable Co., has been named manager of rubber development of the Cornish Wire Co. of New York, N. Y. Mr. Dixon will be located at the company's plant in Williamstown, Mass. When Mr. Dixon left Anaconda Wire, he was supervisor of rubber research and development at the Marion, Ind., plant. Mr. Dixon was graduated from Antioch College in 1936 with a B.S. degree in chemistry. Mr. Dixon is active in the Division of Rubber Chemistry of the American Chemical Society. He is a member of the Institution of the Rubber Industry and the Chicago and Fort Wayne Rubber Groups. Last year, Mr. Dixon served as secretary-treasurer of the Fort Wayne Rubber and Plastics Group.

Phillips Licenses German Firm

Phillips Petroleum Co., Bartlesville, Okla., has licensed Badische Anilin und Soda Fabrik (BASF), of Ludwigshafen on Rhine, Germany, to use the new Phillips-developed catalytic process for making polyethylene and other polyolefin plastics. The agreement gives BASF exclusive use in Germany of Phillips patents and technical knowledge for producing this new family of polyolefins. BASF is one of the principal European manufacturers of chemicals and plastics. Phillips has licensed its polyolefin process to four U. S. chemical companies and six overseas firms and is itself constructing a 110,000 pound a year plant to produce the new polyethylene at its Adams Terminal chemical manufacturing site on the Houston (Texas) Ship Channel.

Carbon Black Prices Dropped

Major producers of carbon black have announced price reductions on carload lots of several different varieties effective May 15, 1956. A drop of four-tenths of a cent has been set on HPC, MPC, EPC and HAF types. These types now sell for seven cents a pound, bagged, in carload quantities. A price drop of one-half cent a pound has been announced for ISAF black, with this type now selling for eight and one-half cents a pound, bagged, in carload quantities. Prices for lcl lots remain stable.

Names in the News

WILLIAM S. RICHARDSON, president of the B. F. Goodrich Co., Akron, Ohio, has been reelected a board member of the National Industrial Conference Board for a term of one year.

ROSS H. DEAN, former sales manager of the Special Products Division, Pressed Steel Tank Co., Milwaukee, Wisc., has joined Sterling, Inc., Milwaukee, Wisc., as sales manager.

RANDOLPH H. BERNARD, president of L.O.F. Glass Fibers Co., Toledo, Ohio, and a director of Foster-Forbes Glass Co., Marion, Ind., has been elected a director of the Landers Corp., Toledo, Ohio.

JOHN T. CLARK, sales representative for the Chemical Division, Eagle-Picher Co., in the Cincinnati, Ohio, area, has been transferred to the Joplin, Mo., office to head the paint research and sales service activities.

D. R. MACKIE, acting managing director of Monsanto Chemicals, Ltd., London, England, has been appointed managing director by the board of directors.

WILLIAM L. RIDER, operations manager of the United Clay Mines Corp., Trenton, N. J., has been named to the board of directors, succeeding C. W. Hall, who recently resigned. WILLIAM F. GUENTHER, company comptroller, has been named assistant treasurer.

JOHN R. JONES, assistant manager of sundries sales for the B. F. Goodrich Industrial Products Co., Akron, Ohio, has been named field sales manager for the Sundries Department.

DR. PAUL A. MUNTER, supervisor of the Analytical Department, Pennsylvania Salt Manufacturing Co., Philadelphia, Penna., has been advanced to director of analytical research.

JERE D. BUCKLEY, a vice-president of the Guaranty Trust Co. of New York, has been elected to the board of directors of the Columbian Carbon Co., New York, N. Y.

E. A. DAWSON, formerly vice-president of the Turner Halsey Co., New York, N. Y., has been appointed executive vice-president.

FRANCIS H. BEEBE, associated with the Interchemical Corp. since 1937, has been appointed manager of the company's newly-created Commercial Development Department.

J. S BRUSKIN, formerly sales manager of the Films and Flooring Division of the Goodyear Tire & Rubber Co., has been named general manager of the division.

DR. EDWARD U. CONDON, formerly director of the National Bureau of Standards, has been appointed Professor of Physics and head of that department at Washington University.

JOSEPH E. DIERKES, formerly associated with the Acheson Dispersed Pigments Co., has joined the colloidal dispersions unit of the Columbian Carbon Co. as head of control and production at the new Tacony plant.

ROBERT E. SPOERL, a sales engineer with U. S. Rubber Co. for six years, has been appointed chief sales engineer for the conveyor and elevator belting department.

DR. CHARLES N. FREY, lecturer and consultant at the Massachusetts Institute of Technology and for many years director of research and development of Fleischmann Laboratories, Standard Brands, Inc., has received the 1956 Honor Scroll of the New York Chapter of the American Institute of Chemists.

DR. SIDNEY PEARSON has joined the staff of the Shadyside Research Laboratory of the Barrett Division, Allied Chemical and Dye Corp. He will investigate the synthesis of new monomers and fine chemicals.

ALBERT E. FORSTER, president and chairman of the board of the Hercules Powder Co., has been named recipient of the 1956 Memorial Award of the Chemical Market Research Association for his contributions to market research.

ROY VAN NESS, associated with U. S. Rubber Co. since 1938, has been appointed manager of packing, special products and matting sales.

PAUL J. SANDRIDGE, formerly assistant manager of the Special Accounts Division, Mansfield Tire & Rubber Co., Mansfield, Ohio, has been appointed sales manager of special accounts, succeeding C. A. EAVES, JR.

D. W. THRONBURG, formerly process engineer in the Refining Department, Phillips Petroleum Co., Bartlesville, Okla., has been promoted to plastics sales engineer in the New York district office of Phillips Chemical.

ALLAN O'NEAL, manager of the Clarksville, Tenn., plant of the B. F. Goodrich Co., has been named to the Committee on Curriculum and Instruction, Education Survey of the Tennessee Legislative Council.

WILLIAM D. GOHR, associated with the Firestone Tire & Rubber Co. for 32 years, has been named manufacturers sales manager.

Tate Elected Vice-President

William B. Tate, Jr.

William B. Tate, Jr., has been elected vice-president of the Georgia Marble Co., Tate, Ga. Except for a short period of time, Mr. Tate has been sales manager of the Calcium Products Division of the company since its inception in 1947.

JOHN L. COLLYER, chairman of the board of the B. F. Goodrich Co. and HARVEY S. FIRESTONE, JR., chairman of the Firestone Tire & Rubber Co., have been named to a committee planning a dinner in honor of Henry R. Luce, editor-in-chief of *Time, Life* and *Fortune*, sponsored by the National Conference of Christians and Jews.

R. L. MCCANN, president of the New Jersey Zinc Co., New York, N. Y., has received the sixteenth annual L-in-Life award from the Lehigh University Club of New York.

ELTON W. CLARK, W. STUART LANDES, and JAMES L. SPENCER, directors of the Thermoid Co., Trenton, N. J., have been elected members of the Executive Committee.

HERMAN MUEHLSTEIN, president of H. Muehlstein & Co., Inc., New York, N. Y., has accepted the chairmanship of the Rubber Division of the Greater New York Fund campaign.

F. E. RICHARDSON, formerly assistant plant manager of the Memphis, Tenn., plant of the Velsicol Chemical Corp., Chicago, Ill., has been promoted to plant manager.

CLARENCE B. SAMPAIR, president of 3-M International, export subsidiary of the Minnesota Mining & Manufacturing Co., has been elected executive vice-president of the parent company, in charge of tape and ribbon products. GEORGE H. HALPIN has been named vice-chairman of the Minnesota Mining Executive Committee.

NORMAN P. PHILLIPS, formerly associated with Sharples Chemicals Inc., has been appointed technical sales representative for "Gen-Flo" paint latex, a product of the General Tire & Rubber Co.

Lapsley Named Vice-President

Rhea P. Lapsley

The appointment of Rhea P. Lapsley as vice-president in charge of research and development for the Okonite Co., Passaic, N. J., has been announced by R. Stuart Keefer, president. In his new capacity, Mr. Lapsley will supervise both the Okonite research laboratories and the company's proving ground. Mr. Lapsley has been associated with the electrical industry since 1921. He joined Okonite in 1936 to open and manage the New Orleans, La., sales office. During World War II, he served in the U. S. Army as Chief of the Electrical Section, South Atlantic Division Corps of Engineers. Mr. Lapsley returned to Okonite in 1946 as assistant chief engineer at Passaic. Five years later, he rejoined the sales organization and, until his new appointment, was manager of the Wilkes-Barre Division. Mr. Lapsley is an electrical engineering graduate of Alabama Polytechnic Institute. He has also had legal training.

Armstrong Mobile Trailer Tire

Featuring an extra-mileage tread design with broader, flatter, and a 15% deeper tread, the "Armstrong Mobile Trailer Tire" is said to give greater tread wear and long lasting anti-skid safety for thousands of extra miles, the Armstrong Rubber Co. of West Haven, Conn., states. The tire also allows trailers to stand idle without fear of sidewall checking due to the ozone resistant compound built into the tire. The Armstrong Mobile Trailer Tire gives heavy-duty service, maximum mileage, better traction and greater recappability, plus low cost per mile operation; provides uniform pressure across the entire width of the tread assuring longer, more even wear on all wheel positions and protects against cuts, cracks, and heat, the company states. Its wide angled, tapered grooves provide efficient stone ejection. The Mobile Trailer Tire is available at Armstrong distributors in sizes 7.00/15 6 ply, 7.00/15 8 ply, 7.50/15 8 ply and 750/15 10 ply.

Cohriastic HT 655 and 666

Two new silicone rubber compounds with tensile and tear strengths and elongation properties more than double those of conventional silicone rubber have been developed by the Connecticut Hard Rubber Co., New Haven, Conn., for molded and extruded parts. Known as "Cohrlastic HT 655" and "HT 666", it is claimed that the new compounds overcome the major defects of conventional silicone rubber, namely low tear strength and poor abrasion resistance. HT 655, a 50 Durometer methyl base material, is particularly designed for high temperature work and will remain flexible at —65°F. HT 666, a 60 Durometer methyl phenyl base material, has original properties equal or better than those of HT 655 in tear resistance, slightly lower in tensile strength and elongation. It has outstanding low temperature flexibility at —100°F. It is stated that the new compounds owe their greater strength and abrasion resistance to the use of an ester coated fine silica filler developed by DuPont and called "Valron".

W. R. Grace Forms New Division

W. R. Grace & Co., New York, N. Y., has established a new division and realigned its present chemical operations. The new division will operate under the name of the Polymer Chemicals Division. T. T. Miller has been named president and Elwyn E. Winne, vice-president. A polyethylene plant for this division is under construction at Baton Rouge, La. The Dewey & Almy Chemical Co., which merged with Grace in November, 1954, has been divided into three divisions. The Dewey & Almy Division will be headed by George W. Blackwood as president and William L. Taggart, Jr., as executive vice-president. The Cryovac Company division will be headed by Bradley Dewey, Jr., and the Dewey & Almy Overseas Company division will be headed by Henry L. Gilbert.

Expanding Akron Warehouse

Construction of a $250,000 building addition has been started for the Harwick Standard Chemical Co., on South Seiberling Street, Akron, Ohio, to provide 33,000 square feet more space for warehouse and general office requirements. The new building, which will add 60% more floor area to the Harwick plant, will extend the present office and warehouse facilities an additional 66 feet to the rear on the entire 250-foot plant and provide two floors with additional truck-loading docks at the rear. This is the second expansion since 1951 when the original warehouse was rebuilt after having been damaged by fire.

Union Bay State Changes Name

Union Bay State Chemical Co., Inc., Cambridge, Mass., has changed the firm's corporate name to the U B S Chemical Corporation. Management and policies of the company remain unchanged. The new corporate name was adopted because of its simplicity and to avoid confusion with other firms.

Transfers Sales Representatives

Charles F. Wimmer

Phillips Chemical Co., a wholly owned subsidiary of the Phillips Petroleum Co., Bartlesville, Okla., has announced the transfer of Charles F. Wimmer, technical sales representative of the Rubber Chemicals Division, from the central sales district headquarters at Akron, Ohio, to the western district office at Chicago, Ill. Mr. Wimmer joined Phillips in 1937. He went to Akron in 1950 and became a technical sales representative in 1954.

Barrett Division Appointments

Barrett Division, Allied Chemical & Dye Corp., New York, N. Y., has announced the appointment of John C. Esher as assistant sales manager of the Chemical Sales Department. In his new capacity, Mr. Esher will be in charge of plasticizers, naphthalene, resins and other coal-tar chemicals. Also announced was the appointment of J. E. Shand as assistant to L. W. Miller, manager of chemical sales. Mr. Esher was associated with Barrett for ten years until 1947 at which time he left the company. From 1949 to the present he served as a technical sales representative and subsequently as plant manager for the Hatco Chemical Co., Fords, N. J. Mr. Shand has been associated with Barrett since April, 1946. He was formerly assistant sales manager.

Phillips Licenses Belgian Firm

Phillips Petroleum Co., Bartlesville, Okla., has licensed Société Solvay et Cie, a Belgian firm having an operating office in Italy, to use in Italy the new Phillips-developed process for making rigid polyethylene. The agreement grants Solvay et Cie exclusive use in Italy of Phillips patents and technical knowledge for producing this new family of plastics. Solvay et Cie, with headquarters in Brussels, is a leading European manufacturer of various chemical products and plastics. Phillips is constructing a 110,000,000 pound a year plant to produce the new polyethylene at its Adams Terminal chemical manufacturing site on the Houston Ship Channel.

Financial News

Parker Appliance Co.

Nine Months to March 31: Net income of $108,496, which is equal to 28c per share, compared with $820,310, or $2.12 per share, in the corresponding period of the preceding year. Net sales totaled $14,961,349, against $16,425,345 in the comparable period of 1955. The decline in earnings is attributed to costs of new product development and lower volume in aircraft business. During 1956, the quarter backlog increased by $2,100,000 to $10,151,000.

American Hard Rubber Co.

Twelve Weeks to March 25: Net profit of $399,184, which is equal to $1.28 a share of common stock, compared with $133,129, or 37c a share of common stock, in the corresponding period of the previous year. Net sales amounted to $6,829,122, against $4,519,686 in the corresponding twelve week period of 1955.

Celanese Corp. of America

Quarter to March 31: Net income of $3,461,766, which is equal to 39c a common share, compared with $3,911,314, or 47c a common share, in the corresponding period of the preceding year. Net sales for the first quarter of 1956 totaled $48,477,887, against $45,851,680 in the comparable 1955 period.

Harshaw Chemical Co.

Six Months to March 31: Net income of $1,159,159, which is equal to $1.21 per share of common stock, compared with $1,139,398, or $1.12 per share of common stock, in the corresponding period of the previous year. Net sales amounted to $32,247,297, against $28,948,219 for the comparable period of 1955.

Wooster Rubber Co.

Six Months to March 31: Net profit of $678,659, which is equal to 63c a common share, compared with $1,287,569, or $1.25 a common share, in the 1955 fiscal year. Net sales in the six-mouth period amounted to $10,078,885, against the fiscal 1955 annual sales figure of $15,797,293.

Stauffer Chemical Co.

For 1955: Net income of $12,299,000, which is equal to $4.04 per common share, compared with $9,210,000, or $3.02 a common share, in 1954. Sales in 1955 totaled $143,624,000, against $117,823,000 in the preceding year.

Minnesota Mining & Mfg. Co.

For 1955: Net income of $34,699,370, which is equal to $4.14 per share of common stock, compared with $24,624,225, or $2.95 per share of common stock, in 1954. Sales in 1955 were $281,860,717, against $230,890,482 in the preceding year.

National Automotive Fibres, Inc.

Quarter to March 31: Net profit of $258,118, which is equal to 24c per share, compared with $985,866, or 90c per share, for the corresponding period of the previous year. Net sales totaled $15,778,030, against $23,320,191 in the comparable period of 1955.

Interchemical Corp.

Quarter to March 31: Net income of $1,064,264, which is equal to $1.23 per common share, compared with $842,873, or 95c per common share, in the corresponding period of the preceding year. Net sales totaled $27,240,194, against $23,771,833 in the comparable period of 1955.

Pittsburgh Coke & Chemical Co.

Quarter to March 31: Net income of $834,000, which is equal to 64c a common share, compared with $577,000, or 51c a common share, in the corresponding period of the previous year. Net sales amounted to $14,527,000, against $11,643,000 in the first quarter of 1955.

American Viscose Corp.

Quarter to March 31: Net profit of $6,473,000, which is equal to $1.27 a common share, compared with $5,930,000, or $1.11 a common share, in the corresponding period of the preceding year. Net sales amounted to $68,576,000, against $66,418,000 in the first quarter of 1955.

New Jersey Zinc Co.

Quarter to March 31: Net income of $1,175,475, which is equal to 60c per share, compared with $1,207,813, or 62c per share, in the corresponding period of the preceding year. Sales amounted to $5,659,414, against $4,849,036 in the comparable period of 1955.

United Carbon Co.

Quarter to March 31: Net income of $1,558,518, which is equal to $1.31 per share, compared with $1,269,614, or $1.06 per share, in the corresponding period of the previous year. Net sales amounted to $16,952,000, against $10,091,883 in the same quarter of 1955.

National Motor Bearing Co.

For 1955: Net income of $904,400, which is equal to $2.13 a common share, compared with $852,680, or $2.00 a share, in 1954. Net sales in 1955 totaled $19,295,009, against $16,107,484 in the preceding year.

Goodall Rubber Co.

For 1955: Net profit of $533,000, which is equal to $3.75 per share, compared with $256,014, or $1.77 a share, in 1954. Net sales in 1955 amounted to $10,313,000, against $7,953,750 in the preceding year.

Goodyear Tire and Rubber Co.

Quarter to March 31: Estimated net profit of $13,418,897, which is equal to $1.32 a share of common stock, compared with $12,028,872, or $1.18 a share, in the corresponding period of the past year. Net sales totaled $335,270,436, against $333,286,839 in the first quarter of 1955.

Thermoid Company

Quarter to March 31: Net income of $377,616, which is equal to 44c per common share, compared with $236,490, or 26c per common share, in the corresponding period of the previous year. Net sales totaled $10,219,114, against $8,676,501 in the first quarter of 1955.

St. Joseph Lead Co.

For 1955: Net income of $12,729,820, which is equal to $4.68 a share, compared with $7,523,503, or $2.77 a share, the year before. Net income in 1955 was 69% above that for 1954. Net sales in 1955 amounted to $121,497,456, 28% above the $95,008,072 in 1954.

Tyer Rubber Co.

Year to February 29: Net income of $221,705, which is equal to $2.00 a common share, compared with $124,432, or $1.07 a common share, in the year ending February 28, 1955. Net sales amounted to $6,747,887, against $5,185,656 in 1955.

General Aniline & Film Corp.

Quarter to March 31: Net income of $1,450,000, compared with $760,000 in the corresponding period of the preceding year. Net sales were estimated at $31,250,000, against $28,885,000 in the first quarter of 1955.

Brunswick-Balke-Collender Co.

Quarter to March 31: Net loss of $107,104 compared with a net loss of $373,845 in the corresponding quarter of the previous year. Net sales amounted to $6,920,070, against $5,619,840 in the quarter ending March 31, 1955.

General Cable Corp.

Quarter to March 31: Net profit of $2,188,621, which is equal to 91c per common share, compared with $1,382,380, or 60c per common shaare, in the corresponding period of the preceding year.

Columbian Carbon Co.

For 1955: Net income of $6,305,977, which is equal to $3.91 a share, contrasted with $4,558,718, or $2.83 a share, in the previous year. Net sales in 1955 totaled $62,781,200, against $52,883,920 in 1954.

Sheller Manufacturing Corp.

For 1955: Net profit of $3,754,515, which is equal to $3.94 a share, contrasted with $2,726,698, or $2.86 a share, in the preceding year. Net sales in 1955 amounted to $55,593,663, against $37,164,986 in 1954.

Firestone Plans Cuban Plant

Harvey S. Firestone, Jr., chairman of the Firestone Tire & Rubber Co., Akron, Ohio, has announced plans for the construction of a $4,000,000 tire manufacturing plant at Havana, Cuba. The new plant, the thirteenth Firestone tire-producing plant outside the United States, will be equipped to produce 100,000 truck and passenger car tires annually. The plant will purchase its supplies from Cuban sources. In connection with his announcement, Mr. Firestone stated: "By establishing this modern tire-producing factory in Cuba, Firestone will be in a position to offer better service to the owners of the 150,000 motor vehicles now on Cuban roads. This new plant will help fulfill the desire of the Cuban Government to be able to produce enough tires within the country to satisfy all domestic requirements of car and truck owners." Other Firestone tire-producting plants outside the United States are located in Hamilton, Ontario, Canada; Brentford, England; Port Elizabeth, South Africa; Bombay, India; Christchurch, New Zealand; Bilbao, Spain; Pratteln, Switzerland; Hamburg, Germany; Viskafors, Sweden; Buenos Aires, Argentina; Sao Paulo, Brazil, and Valencia, Venezuela.

Craig Named Vice-President

Eugene L. Craig has been named vice-president in charge of sales for the Goodrich International Rubber Co., Manila, the Philippines. For the last four years, Mr. Craig has been general manager of the Puerto Rico branch of International B. F. Goodrich Co. Mr. Craig joined Goodrich in Akron as a messenger in 1936. After serving in various capacities in the International company's Akron office, he became the company's sales representative in Hawaii in 1947. Five years later he was named to the Puerto Rican post.

U.S. Rubber Advances Wurzinger

E. C. Wurzinger has been elected an assistant secretary of the U. S. Rubber Co., New York, N. Y., by the board of directors. Mr. Wurzinger joined the company in 1933 in the payroll section of the treasurer's department. At the outbreak of the war, he became a department supervisor at the Des Moines, Iowa, ordnance plant and subsequently was acting control manager of the plant during its deactivation. He returned to the company's New York headquarters in 1949 and, most recently, had been general office manager.

Egyptian Plant in Production

The U. S. Department of Commerce reports that the new plant of the Transport and Engineering Co., Alexandria, Egypt, produced its first tire on January 16, 1956. Tubeless and constructed of nylon cord, the tire is trade-marked "Nisr Supreme." The new factory has a capacity of 280,000 tires a year, but provision has been made for possible expansion to 500,000 tires annually. The plant was established with the technical collaboration of a United States tire-manufacturing company.

LABOR NOTES

B. F. Goodrich Co., Akron, Ohio, and the Firestone Tire & Rubber Co., Akron, on May 26, announced the tire industry's first layoff notices in the wake of sharp cuts in new car production. Goodrich disclosed the indefinite layoff of 140 workers, most of them in Plant 4. Firestone announced plans to do the same thing with "approximately 600" starting "in early June." Another 175 production employes at Firestone's Memphis plant will be dropped at the same time and for the same reason, a company spokesman said. Other tire-rubber concerns in Ohio had no plans for following suit. Seiberling Rubber Co., Barberton, stated that it will "add a few tire builders," and the Goodyear Tire & Rubber Co., Akron, said that "hiring and laying off are in balance at the present time." General Tire & Rubber Co. announced that it had "no plans like that at all."

United Rubber Workers, AFL-CIO, has won the right to be the bargaining representative for employes at three plants of the Swan Rubber Co., Bucyrus, Ohio. In an election supervised by the National Labor Relations Board, the URW won by a narrow margin. Needing 315 for a majority, the union received 318 votes to 298 votes for no union. Twelve votes were thrown out. The same union is the bargaining agent for the company's Carey, Ohio, plant.

Headquarters of the United Rubber Workers union has notified the U. S. Rubber Co., New York, N. Y., that the wage section of their contract has been "canceled." The contract provides for a 60-day notice for such cancelation. A union spokesman said negotiations probably will start in New York City the week of June 21. The union negotiates for 20 of the company's 21 plants, he said. The union's demands were not disclosed.

Barry Controls, Inc., Watertown, Mass., is back in full production though some striking employes are still picketing the gates of the Watertown plant, the company announced. At this writing, about 85% of the employes who struck have returned to work, and new employes have been hired to regain full production. About 80% of the production workers went out on strike during the latter part of January.

Celanese Plans New Plant

Celanese Corp. of America, New York, N. Y., has announced plans to build a multi-million dollar plastics plant near Houston, Texas, for the production of "Fortiflex", a new polyolefin resin. Construction is slated to begin this spring at a proposed 220-acre site south of San Jacinto State Park, with completion scheduled for the first quarter of 1957. Annual capacity will be nearly 40,000,000 pounds. Fortiflex will be produced under license from the Phillips Petroleum Co. Celanese expects it to be used in both consumer and industrial products, including pipe, wire and cable insulation, containers, packaging film, toys and automobile parts.

Appointed Laboratories Manager

Dr. Jacques P. Sibeud has been appointed manager of laboratories for Rhodia, Inc., New York, N. Y. A native of Toulon, France, Dr. Sibeud attended the University of Lyon and graduated with a degree of Ingenieur E.S.C.I.L., which is equivalent to a B. S. degree in engineering chemistry in the United States. He took a post-graduate course at the same university and obtained a Ph.D. in chemistry in 1952. Dr. Sibeud then joined Rhone-Poulenc, Paris, where he was thoroughly trained in the field of synthetic aromatics through development, control and research work. He was associated with Rhone-Poulenc until his transfer to Rhodia this month. Dr. Sibeud is a member of the Societe Chimique de France.

Rhodia has moved to new and larger offices with improved facilities at 60 East 56th Street, New York 22, N. Y. The new telephone number will be PLaza 3-4850. The move will allow expansion of Rhodia's Aromatics, "Alamask" and other divisions, and will enable the company to give more rapid handling of customers' requests and orders.

Velsicol Reports Staff Changes

E. T. Collinsworth, Jr., president of the newly-formed Velsicol International Corp., New York, N. Y., has announced the appointment of James A. Winter as director of sales. Mr. Winter has been associated with the Velsicol Chemical Corp., Chicago, Ill., the parent company, for seven years. It was also announced that Stephen S. Easter, formerly a member of the Entomological Staff of the parent company, was appointed director of technical service. Velsicol International Corp. is responsible for foreign sales of products manufactured by the Velsicol Chemical Corp.

Goodyear Promotes Schiller

M. E. Schiller has been appointed operating manager of the Films and Flooring Division, Goodyear Tire and Rubber Co., Akron, Ohio. Mr. Schiller began his service with the firm as a member of the mailing department in 1923. In 1925, he moved into production work, filling consecutive capacities of production control clerk, dispatcher and head scheduler, before joining flooring sales as correspondent in 1947. Mr. Schiller transferred to the Films, Foam and Flooring sales staff in 1949 and was named to his most recent post as section head within that division in 1950.

Goodrich Appoints Managers

Herbert H. Fink, formerly technical manager of belting, has been named manager of all hose technical activities, including development and field engineering, for the B. F. Goodrich Industrial Products Co., Akron, Ohio. Mr. Fink has been with Goodrich since 1933. Randolph W. McGahey, formerly section manager of compounding and design for flat belting, has been appointed manager of all belt technical activities, including development and field engineering. Mr. McGahey joined Goodrich in 1925.

West Coast News

Approximately 300 members and guests of the Los Angeles Rubber Group attended the May 1st meeting held at the Hotel Statler in Los Angeles, Calif. The technical speaker at the meeting was H. Logan Lawrence, sales manager for neoprene and Hypalon for the Elastomers Division of E. I. du Pont de Nemours & Co., Inc. Mr. Lawrence spoke on "Compounding and Manufacture of Hypalon Synthetic Rubber". The non-technical portion of the meeting was addressed by Lloyd V. Prante, principal of John Adams Junior High School. Mr. Prante spoke on "Eat Your Apple Now".

In his address, Mr. Lawrence described the early developmental work done on Hypalon and considered the chemistry of its manufacture. He went on to describe the basic curing formulations for Hypalon. The speaker pointed out that from a processing standpoint, Hypalon differs from other elastomers in two important respects. First, the effect of milling on breakdown, and second, the effect of temperature on the viscosity of the polymer.

The speaker then discussed blends of Hypalon with other elastomers and offered some data on vulcanizate properties. Such matters as Hypalon paints and coatings were taken up. To this end, Mr. Lawrence outlined the manner in which Hypalon coatings and paints are prepared and what may be expected from these products. Mr. Lawrence illustrated his talk with a series of interesting slides.

Accurate Products Co. Inc., San Diego, Calif., is expanding its operations to encompass general distribution. James G. Wilson, president, announced the firm will handle a complete line of rubber products. Accurate moved to San Diego from Culver City, Calif. in 1950. It employs about 75 persons in a 26,000 square foot plant. Mr. Wilson said he believes San Diego will grow industrially and wants to enjoy the position of being on the ground floor for such growth. "Now that freight rates have been equalized and San Diego is on a par with Los Angeles and other West Coast cities, we are able to be competitive in every part of the country. About 75% of our output goes to Eastern cities," he said.

Mr. Wilson has been in the rubber manufacturing business for 25 years. He started with Garlock Packing and owned Wilson Packing & Rubber until he sold the firm in 1947. He operated the Culver City plant from 1943 to 1950.

Products manufactured at Accurate include dental polishing cups, mountings for automobile mufflers, suction cups for automatic printing machines, parts for calculating machines, grommets for hearing aids and car radios, "feet" for adding machines, weather stripping, eyelash curlers, and fender stripping.

"We claim to be the largest manufacturer of products of this type in the world," Mr. Wilson states. "We have developed about 1,000 molds." Besides its San Diego operations, Accurate maintains a sales office in Los Angeles and has distribution representatives in most major U. S. cities.

The rubber industry in the West took another forward stride recently when construction started on a $7,500,000 addition to the Los Angeles plant of the Goodyear Tire and Rubber Co. The new building marks the latest expansion in the firm's Los Angeles facilities, established in 1921 for the manufacture of tires and industrial rubber products. It is also part of a two-year $100,000,000 plan for expansion of Goodyear facilities both in this country and abroad.

Present for brief groundbreaking ceremonies were Kenneth Hahn, Los Angeles County supervisor, Dent V. Thomas, plant manager, and Thomas E. Fellows, chief engineer of Ford J. Twaits Co., Los Angeles, contractors and engineers for the project.

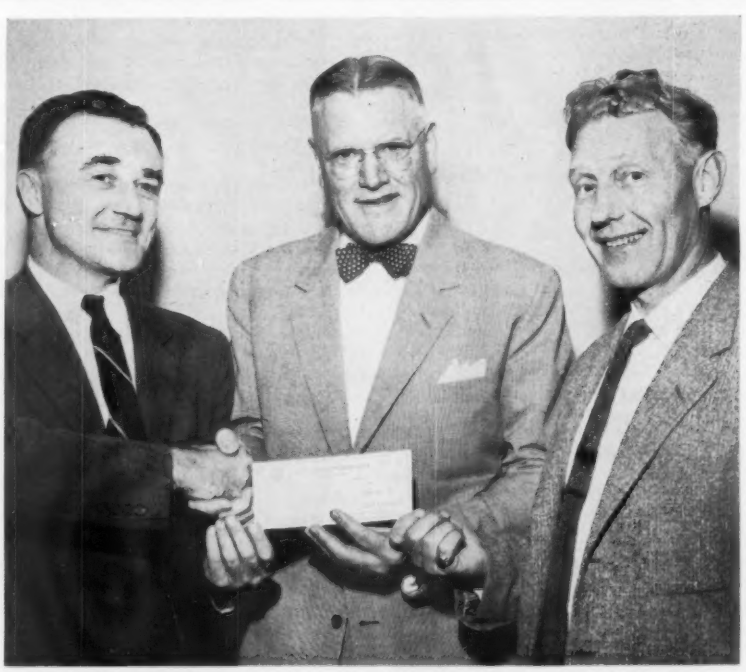
The new building, 140 by 540 feet, will adjoin the south side of the present plant at 6701 South Central Avenue. Completion is expected by February, 1957. It will be a one-story structure with a basement, and will house the most modern curing facilities for passenger and truck tires. Daily production of the new presses will exceed 11,500 tires.

The Synthetic Rubber Sales Division of the Shell Chemical Corp., Torrance, Calif., has made a grant of $5,000 to the rubber research program conducted jointly by the University of Southern California and the Los Angeles Rubber Group. Announcement of the grant was made by Carl Hoglund (R.D. Abbott), chairman of the Los Angeles Group. Presentation of the check for the grant was made to Mr. Hoglund and USC President Fred D. Fagg, Jr., by J. P. Cunningham, manager of the Synthetic Rubber Sales Division of Shell Chemical.

Charles D. Thurmond, formerly associated with the Pacific Moulded Products Co., Los Angeles, Calif., has joined the Richfield Oil Corp. of Anaheim, Calif.

Los Angeles Chemical Co., Los Angeles, has begun construction of a $300,000 plant on an 8½ acre site at 4565 Ardine Street, South Gate, Calif. It will replace the present plant on South Santa Fe Avenue.

Stillman Rubber Co., Culver City, Calif., has enlarged its storage facilities with an additional 8,000 square foot extension.



J. P. Cunningham (left), manager of the Synthetic Rubber Sales Division of Shell Chemical is shown here presenting a $5,000 check for the rubber research program conducted by the University of Southern California and the Los Angeles Rubber Group to F. D. Fagg, Jr. (center) USC president and Carl Hoglund (right), chairman of the Los Angeles Group.

Miles Joins Akron Chemical

J. E. Miles

J. E. Miles, formerly associated with the B. F. Goodrich Chemical Co., Akron, Ohio, has joined the Akron Chemical Co., Akron, as technical sales representative. In his new capacity, Mr. Miles will represent the company in portions of the midwest on its rubber chemicals, pigments and colors. A graduate of Case Institute of Technology with a degree in chemical engineering, Mr. Miles joined Goodrich in 1943 and has been with the Goodrich Chemical Co. since 1952.

To Build New Styrene Plant

Harvey S. Firestone, Jr., chairman, has announced that the Firestone Tire & Rubber Co., Akron, Ohio, will build a 75,000-ton capacity plant for the manufacture of styrene at its 1000-acre petrochemical manufacturing center near Orange, Texas. "By establishing its own manufacturing facilities for both styrene and butadiene," Mr. Firestone said, "our company becomes the first in the rubber industry to produce the principal raw materials for the manufacture of its synthetic rubber." It was disclosed that the new styrene plant will be located adjacent to the company's recently announced 40,000-ton capacity butadiene manufacturing plant which is scheduled for completion early in 1957. The Firestone styrene plant will be in operation early in 1958.

Sheller-Standard Plan Merger

Directors of the Standard Products Co., Cleveland, Ohio, and the Sheller Manufacturing Corp., Detroit, Mich., have agreed on a proposal for a merger. The merger proposal calls for an exchange of two common shares of Sheller for three common shares of Standard Products. Standard Products would be operated as a division of Sheller. A definitive merger agreement will be submitted at a latter date to stockholders of both companies. Tom Bradley would continue as chairman and president of Sheller, while J. S. Reid, chairman and president of Standard Products, would become vice-chairman and also chairman of the Research and Development Committee of Sheller.

Tire Yarn Developments Reviewed

At a recent technical meeting held in Akron, Ohio, staff members of the Textile Fibers Research Laboratories of E. I. du Pont de Nemours & Co., Inc., offered a technical review of developments in rayon and nylon tire yarn. In attendance were engineering staff members from seventeen rubber companies, yarn processors and equipment manufacturers. In discussing fundamental research on nylon and rayon, Dr. C. E. Black described the basic properties of polymers and their crystalline structure, and W. W. Ransom commented on skin and core characteristics and their meaning in yarns. Cord processing developments and the effect of tire curing techniques on fiber performance were reported on by M. Kiachif, who described improved dip stretching in rayon tire yarn and its results. Dr. A. G. Knox discussed hot stretching and DuPont's study of results and effects on properties of yarns. D. H. Heckert reported on DuPont's study of tire cord performance. The extensive facilities devoted to research and development of improved cord was described by R. W. Nebel, and Dr. J. M. Swanson reported on the effect of performance on tire durability and ride performance. Leading the discussion were H. P. Brokaw, C. E. Mears, Dr. P. M. Walters, and R. H. Stafford.

Weller Named Operating Manager

W. E. Weller, formerly operating manager of the Films, Foam and Flooring Division of the Goodyear Tire & Rubber Co., Akron, Ohio, has been named operating manager of Foam Products. Mr. Weller joined Goodyear as a trainee in 1938, following graduation from the University of Michigan where he earned a master's degree in business administration. He was first assigned to Goodyear's Jackson, Mich., plant as a cost clerk, and a year later he assumed similar duties in Akron. In 1940, Mr. Weller became a supervisor in the factory accounting department and handled Airfoam and gas mask costs. He was transferred to the Goodyear Aircraft Corp., Akron, in 1941, where he filled various managerial posts. In 1946, he returned to Goodyear as an Airfoam staffman, and a year later he was appointed operating manager of the Chemical Products Division.

United Carbon Elects Officers

T. A. Whelan, a co-founder of the United Carbon Co., Charleston, West Va., has been elected president and S. C. Coleman, a member of the board for 19 years, chairman of the board. In addition, Oscar Nelson, Jr., has been chosen president of three United Carbon subsidiaries—United Carbon Co., Inc., United Producing Co., Inc., and United Rubber and Chemical Co. Mr. Nelson retains his post as United Carbon executive vice-president in addition to assuming the presidency of the company's three major subsidiaries. These executive changes were effected at United Carbon's annual meeting and followed the resignation of Thorne F. Koblegard as company president. Mr. Koblegard remains as a member of the United Carbon board of directors and executive committee.

Carpenter Named Manager

F. S. Carpenter

F. S. Carpenter has been appointed manager of the White Pigments Division of Godfrey L. Cabot, Inc., Boston, Mass. Mr. Carpenter will direct the production and sales of Wollastonite, Cab-o-sil and clay. A graduate of the Massachusetts Institute of Technology, Mr. Carpenter has been closely connected with the development and sales of these products since he joined Cabot in 1948.

To Vote on Bond Proposal

Stockholders of the U. S. Rubber Co., New York, N. Y., will vote on June 29 on a proposal to amend the certificate of organization permitting the company to issue convertible bonds. Past growth and future growth will probably require $50,000,000 to $60,000,000 in additional funds, according to the proxy statement sent to stockholders. H. E. Humphreys, Jr., chairman, said directors had been giving consideration to various methods of raising the additional funds. One method under consideration was issuance of debentures which would be convertible into common stock, he said. The proxy statement explains that types of securities, method of sale and markets to be approached would be decided in accordance with conditions existing at the time of decision, and that if convertible debentures should be decided upon, the company intends to offer them pro rata to holders of common stock.

Sims Named Plant Manager

National Aniline Division, Allied Chemical & Dye Corp., New York, N.Y., has appointed Ross M. Sims plant manager in charge of all operations of the Moundsville, West Va., plant. Superintendent of the Moundsville plant since 1953, Mr. Sims participated in the expansion of National Aniline's operations and facilities in that area. From 1944 to 1953, Mr. Sims served in various capacities at the Buffalo, N.Y., plant. He joined Allied Chemical's Semet-Solvay Division in 1939 at the Ensley plant in Birmingham, Ala.

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Canadian News

Gates Rubber Co. of Canada Ltd., wholly owned subsidiary of the Gates Rubber Co., Denver, Colo., has announced a $1,000,000 expansion program to triple the size of its plant at Brantford, Ont. The Canadian plant, which has been in operation since early in 1954, is being expanded to take care of increased volume and expanded lines, company officials stated. Production at the Brantford plant is limited primarily to V-belts and allied products. Harold Palmer, former superintendent of tire production at the Denver plant, was transferred to Brantford several months ago and placed in charge of manufacturing there. Construction work on the new addition is scheduled to get underway soon and completion is expected later this year.

Dunlop Canada Ltd., Toronto, Ont., has reported that record sales were achieved in 1955 despite serious dislocation of production facilities caused by the transfer of production from Toronto to the new tire and foamed latex factories at Whitby, Ont. The transfer, completed and brought into operation in the latter part of 1955, resulted in a net loss of $1,127,459, although the actual result of trading operations showed a profit of more than three times that of 1954. The company's authorized share capital was increased to $11,900,000, the parent company, Dunlop Rubber Co., England, investing an additional $3,500,000 in common stock during 1955.

Pretty Ware Ltd., a new Canadian subsidiary of Pretty Products Inc., Coshocton, Ohio, expects to set up manufacturing facilities on Racine Road in the Rexdale industrial area where office and plant facilities are presently under construction. The parent company manufactures a wide range of molded and dipped rubber products for home and industry, and many of these will soon be in production at Rexdale. Present warehousing operations will also be transferred to the new location.

Gutta Percha & Rubber Ltd., Toronto, Ont., has announced the following executive changes in the company: J.M. Allison, treasurer, has also been named vice-president and assistant general manager; J.H. Crane, formerly manager of manufacturing, has been appointed director of Industrial Relations; F.J. Hall, whose position has been manager of the Development Department, has become director of planning; T.H. Way has been advanced from the post of assistant manufacturing manager to factory manager; and R.H. Hoppe has been named secretary of the company.

A recent issue of $2,500,000 in bonds by the Phillips Electrical Co., Ltd., Brockville, Ont., will be marketed by W.C. Pitfield & Co., Ltd., and associates. The 5% first mortgage issue, due 1973, will be priced at par to yield 5%. A sinking fund is provided to retire $125,000 yearly from 1959 to 1973. Proceeds will be used for the company's expansion program which calls for expenditure of approximatelv $5,000,000 over the next five years. Phillips is a member of the British Insulated Callender's Cables, Ltd., a group of companies engaged in rolling and drawing copper and in the manufacture of electric wires and cables.

Building Australian Black Plant

United Carbon Co., Charleston, W. Va., has announced plans for a major expansion of its foreign operations with the construction of a carbon black manufacturing plant in Australia. The plant will be built and owned jointly with Shell Chemical Proprietary, Ltd., Australia, according to Oscar Nelson Jr., United Carbon executive vice-president. The plant, which will be located at Geelong, near Melbourne, Victoria, will be the first petrochemical unit built in Australia and the only carbon black plant operating in the southern hemisphere. According to present estimates, the plant project will cost approximately $6,000,000. The facilities will produce oil-base furnace carbon blacks for the Australian rubber industry, Mr. Nelson stated. It is expected that a portion of its output will be exported to New Zealand, Indonesia, India and other Far East countries. Negotiations for the plant project were completed by Wayne Herkness, United Carbon foreign operations officer, during a recent visit to Australia.

Wood Elected Girdler President

The board of directors of the Girdler Co., Louisville, Ky., a division of the National Cylinder Gas Co., Chicago, Ill., has elected W. Roberts Wood president. Mr. Wood succeeds George O. Boomer, who will continue as chairman of the Executive Committee of the National Cylinder Gas Co. Mr. Wood received a bachelor of chemistry degree at Cornell University and was associated with E. I. du Pont de Nemours & Co. before joining Girdler in 1929. In 1939, he was made manager of the Gas Processes Division. He was elected vice-president in 1941 and executive vice-president in 1948. In 1953, he became a vice-president and director of the National Cylinder Gas Co. Mr. Wood is a member of the American Institute of Chemical Engineers, American Gas Association, American Oil Chemists Society, and the American Petroleum Institute.

Wish to express your views? Write a letter to the editor! (See page 384).

FMC-NYU Research Project

New York University College of Engineering and the Chemical Divisions of the Food Machinery & Chemical Corp. have begun an experiment in university-industry cooperation for research. Under the FMC-NYU contract, a five-man research team has access to the NYU Engineering Research Division's facilities and to the consultation services of faculty and staff members. In addition, an NYU graduate student, Hillard Blanck, assisting in the research, has received a $3,000 FMC fellowship for study toward advanced degrees in chemical engineering. Research in the FMC-NYU project includes (1) exploratory petrochemical investigations in polymerization, alkylation reactions, and resin formation, and (2) general preparation and evaluation of catalysts for hydrocarbon reactions.

Major units in the advance laboratory are distillation columns, Orsat gas apparatus, a gas chromatograph, an ultraviolet spectrophotometer, an infrared spectrophotometer, and a vapor phase catalytic reactor unit. The advance laboratory is headed by Dr. L. Marshall Welch, formerly with the Carter Bell Manufacturing Co., E. I. du Pont de Nemours & Co., and the Standard Oil Development Co. Other members of the group are Dr. Louis J. Croce, former senior research chemist with the Socony-Mobil Oil Co.; Russell Mantell, formerly of the Allied Chemical & Dye Co. and the M. W. Kellogg Co.; Laimonis Bajars, former professor of chemical engineering at the University of Latvia, now engineering scientist in the NYU Engineering Research Division; and Ludwig Salce, chemist.

U.S. To Offer Rohm & Haas Stock

Rohm & Haas Co., Philadelphia, Penna., has registered with the Securities and Exchange Commission 4,810 shares of 4% cumulative preferred and 79,213 shares of common stock which the United States Attorney General will offer publicly. Proceeds will go to the government, which seized 34½% of Rohm & Haas stock in 1942 under the Trading With The Enemy Act because it was held by German nationals. Most of the government's holding were sold in 1949. The remaining shares to be offered through the Office of Alien Property are about 7.8% of the outstanding shares of each class of stock.

Goodyear Personnel Changes

Hyle F. Webb, James G. Gates, Edward Raymond, and Raymond F. Brewer have been named to new assignments in the Manufacturers Sales Department of the Goodyear Tire & Rubber Co., Akron, Ohio. Mr. Webb, formerly account executive in Kansas City, succeeds E. T. Rainey as manager of manufacturers sales for the company's Western Division, located in Los Angeles. James G. Gates, promoted to account executive, Kansas City, relinquishes his former assignment as manager of industrial tire sales to Edward Raymond, former manager of truck tire sales. Raymond F. Brewer, a staffman, succeeds Mr. Raymond in handling truck tire sales for the department.

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Obituaries

Philip L. Wormeley

Philip Lightfoot "Judge" Wormeley, who retired in 1947 after 44 years of government service, died recently at his home in Alexandria, Va. He was 78 years old. "Judge" Wormeley, as he was affectionately known, was former assistant chief of the Organic and Fibrous Materials Division of the National Bureau of Standards and chief of the section on Testing and Specifications. Best known for his research on rubber and leather, especially tires and their specifications, Mr. Wormeley was one of the founders of the Division of Rubber Chemistry of the American Chemical Society. Until his retirement in 1947, Mr. Wormeley served as chairman of the committee on Rubber Products and the committee on Gaskets and Packings of NBS. He had held these posts since the organization of these two committees in 1921. An author of many technical papers, his "Testing of Rubber Goods" has become a standard reference work. Mr. Wormeley was born in Richmond, Va., and graduated from the University of Virginia in 1901. He is survived by two daughters and a son.

W. Clifton Rogers

W. Clifton Rogers, a vice-president and general sales manager of the New York Rubber Co., New York, N. Y., died on May 13 at the White Plains (N. Y.) Hospital. His age was 69. Mr. Rogers was graduated from Worcester Polytechnic Institute as a civil engineer. Before joining the New York Rubber Co. in 1928, he was with the Tyer Rubber Co. and the U. S. Rubber Corp. Working with the United States Bureau of Aeronautics, Mr. Rogers developed the first "Mae West" life jacket in the 1920s and a rubber life raft used during World War II. He is survived by his wife and daughter.

George H. Greer

George H. Greer, expert in the wire and cable manufacturing field, died on April 8 at St. Joseph's Hospital, Yonkers, N. Y. His age was 79. He was once a general foreman for the National Conduit and Cable Co., Hastings-on-Hudson, N. Y. Later he was in charge of the Wire Manufacturing Department of Anaconda Wire and Cable Co., Hastings, N. Y. He retired 12 years ago.

Milton H. Fischer

Milton H. Fischer, vice-president of the Composition Materials Co., New York, N. Y., died on May 18th at the Harkness Pavilion of the Columbia-Presbyterian Medical Center in New York. He was 65 years old. Mr. Fischer was graduated from the University of Pennsylvania. He was a member of the City Athletic Club. Surviving are his wife and two brothers.

Edward A. Callanan

Edward A. Callanan, president of the Brown Rubber Co., Lafayette, Ind., died unexpectedly on April 14 at his home in West Lafayette. He was 66 years old. Mr. Callanan served as president of Brown Rubber for approximately sixteen years. Before joining Brown Rubber, he was in charge of Australian operations for the Socony-Vacuum Oil Co., of which he was a director. During his career, he had also served as regional sales manager for the General Motors Corp. Born in Springfield, Mass., Mr. Callanan was graduated from the Massachusetts Institute of Technology in 1914. He was a director of the Lafayette National Bank and of the General Telephone Co. of Indiana. He was also a director of the Rubber Manufacturers Association. Mr. Callanan headed the Red Cross campaign in Lafayette for two years and participated in many other civic activities. Although an alumnus of M.I.T., he participated in the affairs of Purdue University. He is survived by his wife and two sons.

Waldo L. Sherman

Waldo L. Sherman, retired secretary-treasurer of John Robertson & Co., Brooklyn, N. Y., manufacturers of hydraulic machinery, died on April 12 at his home at Montclair, N. J. He was 67 years old. Mr. Sherman was a graduate of Worcester (Mass.) Academy and of Worcester Polytechnic Institute, of which he was a former trustee. He was former president of the Montclair Chapter of the Sons of the American Revolution and a member of the American Society of Mechanical Engineers. He leaves his wife, a son, and two sisters.

William J. Nanfeldt

William J. Nanfeldt, general manager of the World Bestos Division of the Firestone Tire & Rubber Co., New Castle, Ind., died recently after a six-week illness. He was 58 years old. A native of New England, Mr. Nanfeldt was one of the founders of World Bestos in New Haven, Conn., 34 years ago. He remained with the company when it was purchased by Firestone in 1937. Mr. Nanfeldt moved to New Castle in 1946 when the business was transferred there from Paterson, N. J.

Vincent P. Reid

Vincent P. Reid, executive vice-president of the General Tire & Rubber Co. of Canada, Ltd., died on May 21 in Toronto. He had been in poor health for the past year due to a heart condition. His association with General Tire dates from 1926 when he became a salesman for the company in eastern Pennsylvania. He became executive vice-president and director of the Canadian division in 1946. Mr. Reid was a native of Wilkes-Barre, Penna.

William E. Ireland

William E. Ireland, vice-president in charge of sales for B. F. Goodrich of Canada, Ltd., died recently at the Kitchener-Waterloo General Hospital, Kitchener, Ont., Canada, after suffering a heart attack. He was 47 years old. Mr. Ireland graduated from Ohio Wesleyan University. He joined Goodrich in 1934 in Akron, Ohio. Mr. Ireland served with the company's associated lines sales division until 1942, when he was loaned to the U.S. War Production Board as a dollar-a-year man. He was chief of the agency's Tire and Tube Production Division. Mr. Ireland returned to the B. F. Goodrich Co. in 1945 as manager of replacement passenger tire sales. He came to Canada in 1950, after serving as vice-president of sales of the International B. F. Goodrich Co., and in 1954, he assumed the vice-presidency of sales for the Canadian company. Surviving are his wife, two sons and a daughter.

Richmond C. Quortrup

Richmond C. Quortrup, assistant manager of chemical sales for the Barrett Division, Allied Chemical and Dye Corp., New York, N. Y., died on May 25 at the Manhasset (N. Y.) Medical Center. He was 57. Mr. Quortrup studied chemistry at Columbia University, the Pratt Institute and Brooklyn Polytechnic Institute. He belonged to the Salesmen's Association of the American Chemical Industry and the Chemical Specialties Manufacturing Association. Surviving are his wife and a son.

Onnie L. Law

Onnie L. Law, a chemical engineer for the Goodyear Tire & Rubber Co., Akron, Ohio, died on April 26 in Brooklyn, N. Y. He was 41 years old. A native of Finland, Mr. Law grew up in Brooklyn and graduated from Technical High School there. He received a B.S. degree in chemical engineering from Columbia University. Mr. Law joined Goodyear in 1951 as a senior chemical engineer and worked in sales technical service.

Cody Ressegger

Cody Ressegger, plant manager of the Swan Rubber Co., Bucyrus, Ohio, died on April 24. His age was 62. Mr. Ressegger joined Swan Rubber in 1930 as plant manager and served in that capacity until his death. He had been active in the rubber industry for 45 years, having been associated with Miller, Goodyear and the Firestone companies prior to his association with Swan. Mr. Ressegger is survived by his wife and son.

J. G. Milligan

J. G. Milligan, president of the J. G. Milligan Co., Milwaukee, Wisc., died suddenly on April 8th at his home at Miami Beach, Florida. He was 63 years old. A native of Milwaukee, he spent his youth in St. Paul before returning to Milwaukee to found his company. The firm produces latex adhesives and coatings for the shoe, automotive, paper, and textile trades. Mr. Milligan is survived by his wife, a son and daughter.

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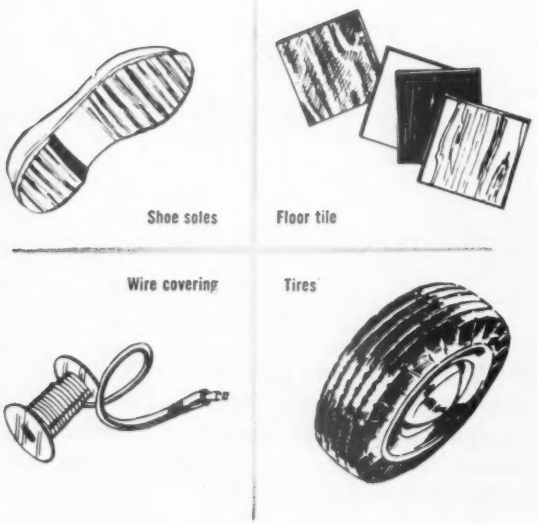

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Golf Practice Putting Cup

South Bend Modern Molding, Inc., 815 E. Mishawaka Ave., Mishawaka, Ind., is now marketing a practice putting cup that golfers can use both indoors and outdoors. Made of flexible live rubber, the "P'rfect Putting Practice Cup" has a suction bottom that holds tight on any flat surface, regardless of how hard the ball strikes it.

The flexible rubber lip permits the ball to fall into the cup, and, if used on a rug or carpet, a patented construction and grass-like feature provides cushion and prevents the ball from bouncing out. The cup can also be used outdoors on a walk, driveway or smooth lawn for practicing chip shots. The practice cup is now packaged six to a carton.

Silicone Center Golf Ball

A new golf ball with a silicone liquid center, a new "high energy" thread that is said to give increased power and faster get-a-way, and a 25% thinner cover has been developed by the U. S. Rubber Co., 1230 Avenue of the Americas, New York 20, N. Y. The new ball carries the "U. S. Royal" brand name and will be available in the new diamond or dimple cover markings. Silicone liquid replaces the previous core used earlier. It helps give an improved feel and "click," according to the company. The rubber thread compound is newly improved, and each ball has 4.5% more yards of thread. The tensioning of the new thread contributes to a livelier, more resilient ball. The Cadwell cover is 25% thinner than in previous balls, the company says, but durability is greater because of the improved curing process used.

The new ball is highly resistant to cutting and scuffing and washes easily. Electronic winding gives uniformity and exact tensioning, so that the ball has a true flight. The four types of U. S. Royals incorporating the new features are the U. S. Royal Special, for the hard-hitting championship and tournament player; the U. S. Royal Blue, for the low-handicap, easy-swinging player; the U. S. Royal Red, for greater durability and distance, and the U. S. Queen Royal, which is specially constructed to suit the swing of the lady golfer. The balls meet all specifications of the United States Golf Association.

AVISCO RAYON, the "muscles" in this beltroad, is produced in a wider range of high-strength yarns than any other brand

American Viscose Corporation produces a wider range of both high-strength staple and filament yarns than any other manufacturer.

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1—their superior strength and durability

2—their dimensional stability in processing

3—the thorough, professional service offered by American Viscose representatives

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Akron, Boston, Chicago, Los Angeles, Trenton,
Albertville, (Ala.), Denver

Goodyear Terra-Tire

The "Terra-Tire," a barrel-shaped, low-pressure pneumatic tire that can be powered through its axle by any conventional drive system, has been announced by the Aviation Products Division, Goodyear Tire & Rubber Co., Akron, Ohio. Claimed to be free of the weight and mechanical complications that burdened previous tires of its type, the Terra-Tire can take trucks, trailers and other off-the-road vehicles over all types of terrain and roadways. Speeds up to 65 miles per hour have

been achieved. Through a hub and axle fitting, the tire receives its motive power directly from the engine. This tie-in with conventional drive systems means a considerable savings in weight, mechanical complication and cost, Goodyear states. Earlier low-pressure "cousins" of the Terra-Tire were friction-powered through their upper surfaces by a series of cumbersome rollers.

Developed for use by the Transportation Corps., Terra-Tires can go where conventional tires are unable to because of a low pressure inflation of between three and five pounds. The soft pneumatics tend to swallow up rough, uneven surfaces with little risk of puncture or blowout by conforming with uneven surfaces instead of resisting them. The tires act as built-in shock absorbers. Heavy loads can be sustained because weight is spread over wide areas of the tires. Low ground bearing pressure and extremely large footprint of the tires make it possible for vehicles to roll over cultivated areas without rutting.

Flexible Sheet Rubber Doors

Stic-Klip Manufacturing Co., Cambridge, Mass., has announced the development of a new, flexible door, "Rubbair," that will help to cut maintenance costs in factories, warehouses, hospitals, restaurants and supermarkets. Made of reinforced sheet rubber, supplied by the Boston Woven Hose & Rubber Co., Rubbair doors absorb the jolts of loaded lift trucks, yet cause no damage to materials carried. Flexible doors are unharmed in a situation where lift-truck loads of material are moved through the doors and a sharp turn bends the door beyond the limits of the hinges. In addition to the conveyor belt surfaces, an interior construction of "H" extrusion of GR-S type rubber cemented to the belting is included. Where grease or oil conditions prevail, neoprene sheet rubber is available. Rubbair doors are especially recommended for hospitals, where the noiseless feature separates busy areas from the patients, and for industrial plants, where interdepartmental deliveries can be speeded up with a minimum of maintenance costs.

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the performance-proved magnesium oxide—is characterized by controlled surface activity and rapid acid acceptance. These properties promote a delayed action cure that results in:

1. Complete and uniform mold filling before cure.
2. Less scrap—saves you money.
3. Improved stock-knitting with reduced pre-cure laminations.
4. Increased production due to shorter and hotter curing cycles.
5. Improved mold-flow and stock-knitting in transfer molds.
6. Superior transfer molding of compounds of higher plasticity and hardness.

Stocks are quickly available from 15 strategically located warehouses. Write for sample of MAGLITE D to—Merck & Co., Inc., Marine Magnesium Division, Dept. R1, Rahway, N. J.

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MAGNESIUM PRODUCTS

Vinyl Foam Plastic Tele-Muff

The "Tele-Muff," a vinyl foam plastic specialty that stretches to fit any telephone, inter-com or dictation machine to deaden outside sound, even in noisy factories and busy office buildings, is now available from the Tele-Muff Co., 1421 First St., San Fernando, Calif., a

division of the Stillman Rubber Co. Long-lasting and washable, the Tele-Muff is available in a wide range of attractive colors and can be imprinted with firm name, telephone number, slogan, etc. An advantage of the Tele-Muff is its comfort, the company states. Office secretaries using the item report they can hear telephone conversation clearly and distinctly even when they are wearing large earrings. Tele-Muffs may be washed and refitted to the receiving instrument.

Thermoid Carloader Belt

To better serve plants handling large quantities of bulk materials, the Thermoid Co., Whitehead Road, Trenton 6, N. J., has designed a new belt for carloader service. Carloader belts, sometimes called "thrower" or "slinger" belts, combine conveyor and power tranmission design. High belt speeds (2100 fpm), relatively small diameter of pulleys (8 inches) and short center-to-center distance of the pulleys make carloader or slinger service exceptionally severe. Conveyor belts of conventional design with normal, heavy top and bottom covers of rubber will not perform well because of the high temperatures developed by continual flexing over the pulleys at high speed. It was discovered that a thinner belt without the conventional heavy top and bottom rubber covers would last longer. The new carloader belt consists of special construction to combat high speeds, small pulleys and chemical reaction of materials handled. Carloader belts are available in three sizes, all made endless by vulcanizing at the manufacturer's plant.

The ring of quality

Colorful, low-cost sidewall rings that can be quickly installed on tires are now contributing to the luxury-look of today's new cars. They're inexpensive, stay brilliant for life, wash bright in seconds, out-last tires. A product of The Bearfoot Sole Co., Wadsworth, Ohio, these rings are available in a variety of colors or in white. They're made of Enjay Butyl Rubber because no other rubber tested could equal its performance in severe laboratory and road tests. The Enjay Butyl label on the Flex-A-Wall® carton assures the buyer of outstanding quality.

Find out for yourself the many technical advantages of Enjay Butyl—the rubber that is outperforming natural and other types of rubber in a wide variety of industrial and consumer applications. For full information, and for technical assistance in the use of Enjay Butyl, write, wire or phone the Enjay Company.

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ENJAY *Pioneer in Petrochemicals*

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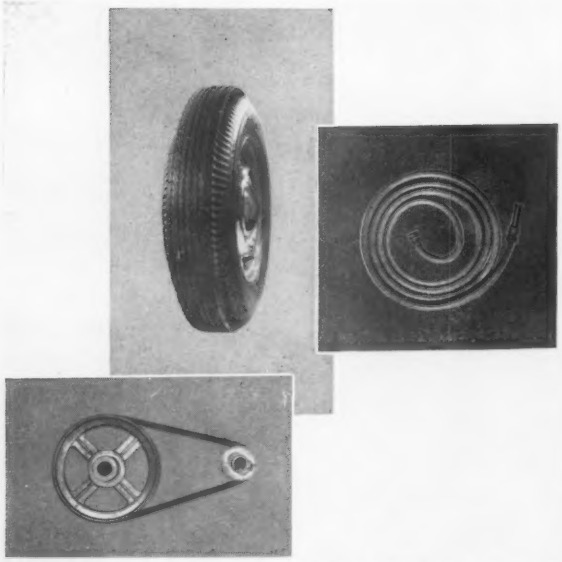
Enjay Butyl is the super-durable rubber with *outstanding* resistance to aging • abrasion • tear • chipping • cracking • ozone and corona • chemicals • gases • heat • cold • sunlight • moisture.



IMPROVE ADHESION AND STABILITY OF YOUR DIP SOLUTIONS WITH SYNVAR RESINS

NEW LINE OF SYNVAR BONDING RESINS SOLVES LATEX DIP PROBLEMS IN TIRE AND RUBBER COATING INDUSTRIES.

■ SYNVAR can solve many of those adhesion problems constantly arising in the manufacture of rubber-fabric products. Take latex dip solutions, for example. Straight resorcinol-formaldehyde (R-F) solutions, added to the dip to improve adhesion, are usable for only 24 hours. Short life of such bonding agents results in a waste of money and time. Synvar bonding resins give latex solutions longer working life; eliminate gelling of dips.

■ SYNVAREN PLS-R is a *stopped* R-F resin that in itself is stable for a year, and for two months or more in a prepared latex dip. It fully replaces R-F solutions, giving adhesions equal to freshly prepared R-F in latex dips. SYNVAREN PLS-R is compatible with a variety of latices, is non-corrosive, and eliminates the need for handling irritating chemicals.

■ SYNVAREN 631 and SYNVARITE BRLD, the phenol-formaldehyde bonding resins for latex dips, have excellent stability. These resins give somewhat lower specific adhesion than SYNVAREN PLS-R, and are considerably lower in cost. Either resin can be used alone or in combination with SYNVAREN PLS-R to obtain balanced physical properties.

■ SYNVAR bonding resins improve the quality of your tires, belt drives, or coated fabrics. Write for SYNVAR specification bulletin No. 300 and information on complete line of rubber compounding resins.

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WILMINGTON 99, DELAWARE

Experienced service to customers is our greatest achievement . . . customer progress and satisfaction our greatest reward.

Nu-Dell Beach Sandals

New lightweight beach sandals molded of Bakelite polyethylene to fit and flex with the foot for active beach, garden and sports wear are now being manufactured by Nu-Dell Plastics Corp., 2250 N. Pulaski Road, Chicago 39, Ill. The foot fits under a flexible strap that hugs the arch and keeps the feather-light sandal from

falling off. In a shower or on a boardwalk, the polyethylene sole protects the foot and keeps it from contact with hot, splintery, or hard, sharp surfaces. Water quickly washes away clinging sand or dirt and does not affect the polyethylene. Ribs are molded into the bottom of the sole to keep the "Clog-Hoppers" cool and to get a grip in shifting sand. The soles do not chip or splinter, are resistant to abrasion, and will wear well despite use on gritty and stony surfaces. Clog-Hoppers are available in five different sizes suitable for men, women and children.

Pinnacle Fire Hose

A new lightweight rubber-covered fire hose, developed for use in refineries, oil fields and oil loading docks, has been announced by the B. F. Goodrich Co. Industrial Products Division, Akron, Ohio. According to company officials, the new "Pinnacle" hose is about 50% lighter weight than conventional rubber-covered fire hose and the most flexible in its field. This means more hose for more protection in far less space and an increased ease of handling that could mean the difference in saving lives and property, the firm states. Pinnacle hose jackets are woven with Dacron filler yarns to obtain great strength without excessive weight or bulk. Filler yarns go "around" the hose and carry the pressure load. Each length of Pinnacle hose is tested to 400 pounds per square inch. An oil-proof, chemical and weather-resistant rubber cover shields the hose jacket from abrasion and protects the new Goodrich hose against the attack of petroleum and chemical products.

POLYSAR can increase the competitive values of your products.

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Because Polysar's quality, uniformity and customer service enable you to raise product standards and cut production costs. From a wide variety of Polysar types, you can choose the one best suited to your technical needs.

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- Special Purpose
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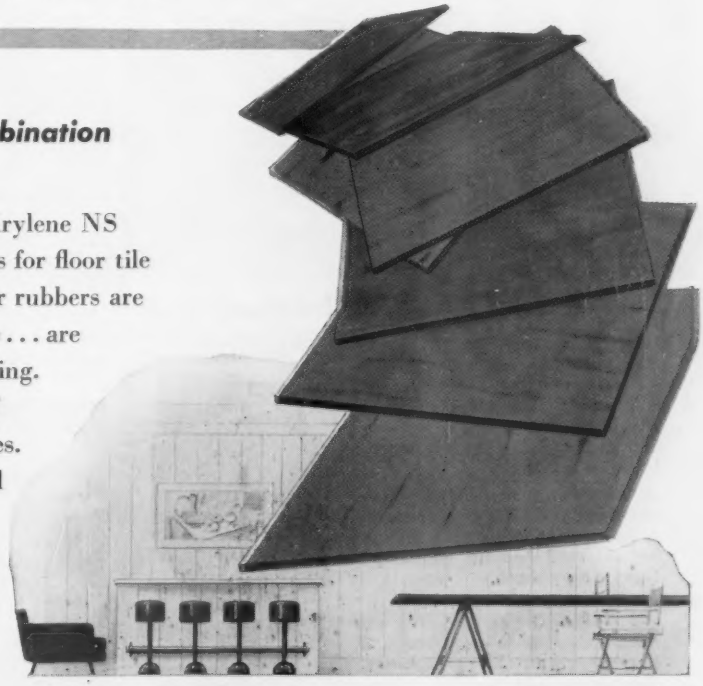
For detailed information about Polysar rubbers, write to our Sales and Technical Division, Sarnia, Canada, or to our U.S.A. distributor, H. Muehlstein & Co., Inc., New York City.

Here's the POLYSAR combination for Floor Tile

Polysar SS-250 and Polysar Krylene NS together provide the ideal basis for floor tile compounds. These two Polysar rubbers are the whitest Polymers available . . . are non-staining and non-discolouring. They permit easy dispersion of pigment and short mixing cycles. Polysar rubbers have improved floor tile—they can improve your products, too.



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The Best Method Yet Devised...

FOR DICING SHEET STOCK

The Famous CUMBERLAND "Stair-Step" Dicer

Here at last is the answer to your problems of dicing rubber or vinyl sheet stock. Produces perfect cubes ranging in size from ⅛ to ½" by merely changing knives.

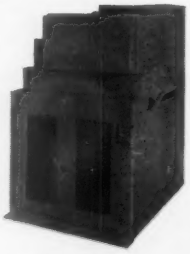
Comes in two sizes designed to handle sheets up to 7" or 14" in width. Other sizes made to order.

Input speeds range from 10 to 125 feet per min. depending on material and size of cube desired.

The CUMBERLAND Rotary Chopping and Dicing Machine

As a chopper, this machine efficiently cuts rubber and vinyl slabs into small pieces. Two sizes available to handle stock widths up to 14 or 24 inches.

As a dicer in modified form, handles principally vinyl sheet stock. A less expensive machine though less universal than the "Stair-Step" Dicer shown above.



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Builders of Better Machines for the Rubber and Plastics Industry

New Equipment

Emmett Robotron Press Control

Featuring the latest developments of components and techniques, the Type E364 Robotron Control for automatic control of hydraulic presses has been announced by the Emmett Machine & Manufacturing Co., Inc., 445 East Turkeyfoot Lake Road, Akron 19, Ohio. According to the company, the control provides the convenience of a completely packaged unit whose installation is simple. The pushbutton section on the keyboard represents the early intervals of time during the curing proc-

ess and each pushbutton, when operated, will close the hydraulic press to bump for gas removal and, in turn, reclose the number of bumps. The intervals of time between them are controllable and can be set up in a few seconds. The adjustment of a pointer on a timer at the right of the panel will control the amount of opening at the press at each bump. After the preliminary bumping period is completed, the timer operates through an extended range with the over-all time controllable by a selector switch giving additional time values. A second range switch permits this selection to be further increased by extending it. Having a hinged panel and printed circuits, the unit is said to be essentially foolproof, easily serviceable and protected against anticipated points of possible maintenance requirements. All relays are enclosed and are of the plug-in type for easy checking or servicing. The timing motor is a plug-in unit and is said to make it possible to readily change a control from one to another of the many ranges available.

Diamonite Grinding Rods

Developed early in World War II to grind extremely hard, highly abrasive aluminum oxide for wartime applications, Diamonite Grinding Rods, manufactured by the Diamonite Products Division, U. S. Ceramic Tile Co., Canton 2, Ohio, are finding increasing uses in industry, including applications in ball mills used for latex compounding. Grind-time is said to be substantially reduced when these rods are utilized. Diamonite itself is a synthetic sapphire substance in bond, being composed of specially-prepared fine-grained crystals of high purity aluminum oxide, held together by a non-metallic

Wooster Rubber Company reduces mold loading weights—with **PLASKON**† Polyethylene Lubricants

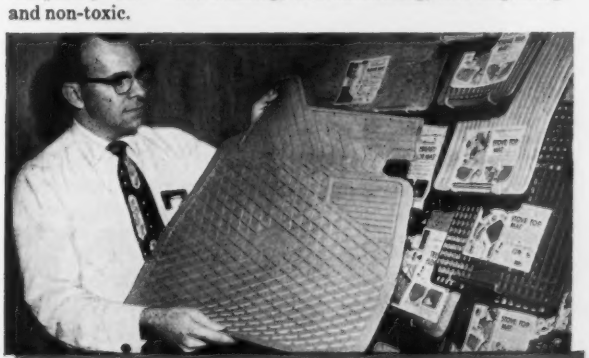
Here's how an alert manufacturer of molded rubber products cuts production costs by adding Barrett's new multiple-purpose polyethylene lubricants to Banbury mix.

1. Here in the plant of Wooster Rubber Co., at Wooster, Ohio, PLASKON Polyethylene Lubricant is added at beginning of the mix to improve processibility of milled stocks. Barrett laboratories have proved the effectiveness of polyethylene lubricants as tack and shrinkage modifiers and anti-blooming agents.

2. Rubber stock is cut from rolls, then conveyed to calender. Tests show that PLASKON Lubricants speed milling and aid filler dispersion in all natural and synthetic elastomers, including neoprene and "Hypalon".

3. Milled stock comes from calender ready for molding. Unlike ordinary lubricants, PLASKON Polyethylene Lubricants are completely safe—non-staining, non-discoloring, non-migrating and non-toxic.

4. With PLASKON Polyethylene Lubricant, rubber stock flows evenly into mold cavity. Considerable cost savings have resulted from reduced mold loading weights.



5. Mr. J. R. Andreas, Assistant Purchasing Agent, exhibits "Rubbermaid" products manufactured at the Wooster plant.

† Trade Mark of Allied Chemical & Dye Corporation

This is but one of many successful applications of PLASKON Polyethylene Lubricants. You may get similar benefits. Ask your Barrett representative for samples and technical data.

BARRETT CHEMICALS

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BARRETT DIVISION, Allied Chemical & Dye Corporation, 40 Rector St., New York 6, N. Y.

Allied Chemical

Pumping Progress Report

FOR MECHANICAL ENGINEERS

An advertisement prepared by The Aldrich Pump Co., Member of Hydraulic Institute, U.S.A.

PUMP INSPECTION, MAINTENANCE AND REPAIR are jobs too frequently ignored by pump designers. In a survey of more than 1,500 pump installations, speed and economy of maintenance was frequently quoted as a major factor in pump selection.

SECTIONALIZED FLUID-ENDS offer an excellent means of guaranteeing both speed and economy in pump maintenance. As originated by ALDRICH Pump Co. engineers, fluid ends have only four main assemblies — the working barrel, suction manifold, discharge manifold and stuffing box.

SPEED IN MAINTENANCE comes with ease of accessibility to wearing parts. Manifolds are slid back on studs and valves removed as complete units. Split collar and flange connection of plunger to yoke permit easy removal of plunger.

ECONOMY OF MAINTENANCE comes with speed in maintenance. Even more important is the simple fact that it is cheaper to replace a single section than a complete fluid-end. When corrosive liquids are pumped, this is particularly important.

THE DIRECT FLOW PRINCIPLE, utilizing the sectionalized fluid-end, was developed by the ALDRICH Pump Co. Aldrich Engineers have become known as the people to see about your tough pumping problems. We have never turned down a challenge.

FURTHER INFORMATION can be had direct from the company. Tell us your requirements and we'll send you Data Sheets describing the pump we recommend. Address your request to: The Aldrich Pump Co., 25 Gordon Street, Allentown, Pa.

vitreous bond of tremendous strength. It has a highly uniform, dense structure. It is inert, non-oxidizing and will not discolor, rust, burn or decompose. The rods have a specific gravity of 3.6 grams per cubic centimeter. This high specific gravity, in combination with a scientific cylindrical spheroid design, affords maximum contact area and results in greatly increased grinding speed on all types of materials. The rods are regularly furnished in two sizes: 13/16-inch diameter by 13/16-inch length and 1¼-inch diameter by 1¼-inch length. They are pure white in color, free of voids, and always present a satin-smooth surface for easy cleaning. They are impervious to liquids and, according to the supplier, possess extremely high resistance to all acids and chemicals.

Uhrden Tubar Dumper

Designed to empty or transfer the contents of one container into another, the "Tubar Dumper" manufactured by Uhrden, Inc., P.O. Box 51, Dennison, Ohio, is said to meet a mounting demand for a unit of this type in rubber, petroleum and chemical operations. It is engineered with an accent on speed, stability, efficiency and safety. Available with either manual or electric lifts, the Tubar Dumper has a capacity of 750 pounds. The

manual model is equipped with a double-acting, variable stroke hydraulic pump. The electric model operates on any standard six-volt automative battery and is furnished complete with charger, but less battery. An outstanding feature of both Tubar models is a positive floor lock, which assures greater safety and stability in handling materials. Forks for pallet and skid dumping are also available as accessories. The main frame of the unit is rigidly welded steel construction. Wheels are mounted inside the main frame channels to reduce clearance and as protection to the wheels themselves. Dumping heights are 36, 48 and 60 inches. Full swivel steering casters measure five inches while the load wheels are six inches in diameter.

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FREE TECHNICAL BULLETINS

An Ozonator for Accelerated Testing of Rubber (Bulletin 36); A Method for Classifying Oils Used in Oil-Extended Rubbers; Circosol-2XH, Sundex-53 (Bulletin 14); Processing Natural Rubber and Synthetic Polymers; Sundex-41; Sundex-53 (Bulletin 18); Sunoco Anti-Chek (Bulletin 30).

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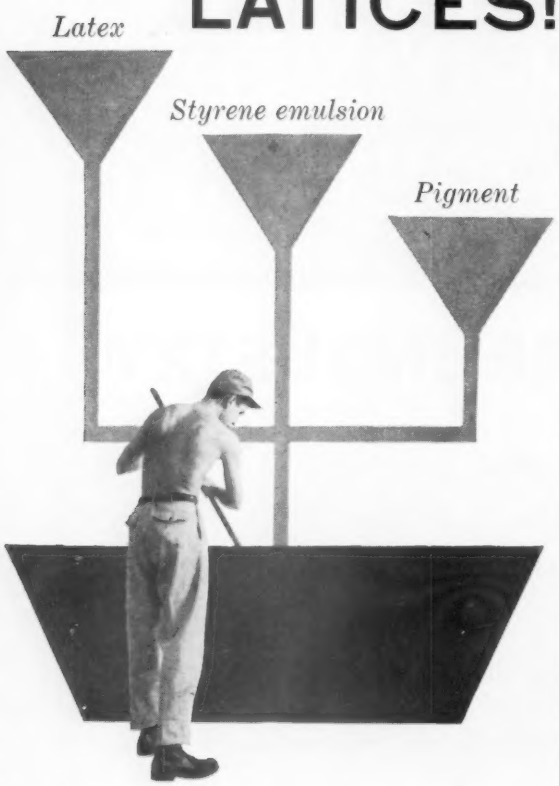
RUBBER LATICES!



No extra mixing step when you use Monsanto's styrene emulsions

Compounding is simplified when you modify synthetic or natural rubber latices with Monsanto's specially formulated styrene emulsions. The fine particle size allows combination of the emulsion with the latex when pigments and fillers are added. No extra mixing step is required.

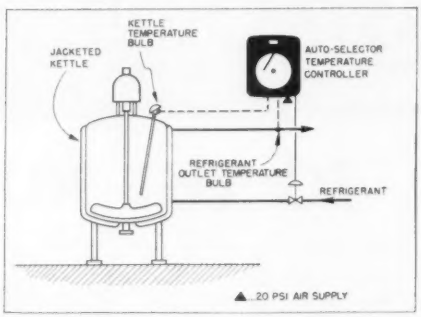
Pre-selected ratios can be controlled exactly—from high-rubber low-styrene to low-rubber high-styrene. Recommended for modifying flexibility characteristics of latex compounds used in manufacturing baby pants, girdles, surgical gloves, upholstery fabrics, rug underlays, adhesives, raincoats, foam rubber and many other products.

Prices and supplies of Monsanto's styrene emulsions are stable. Write today for data sheets and laboratory samples. Monsanto Chemical Company, Plastics Division, Room 950, Springfield 2, Mass.

MONSANTO

Foxboro Selective Controller

A one-instrument solution to problems of both freeze-up and overheating of refrigerant-cooled batch kettles in the cold polymerizing of rubber and plastics has been announced by the Foxboro Co., Foxboro, Mass. Recommended where the reaction is not highly exothermic, the new system is said to use a selective (auto-selector) controller instead of the conventional single-action instrument. When refrigerant outlet temperature, influenced by load changes, tends to drop below the level which might result in freezing, the controller is said to automatically throttle the refrigerant intake valve to raise refrigerant temperature. When the cooling load drops off, the refrigerant temperature can rise above its preset minimum and the controller can again act on kettle temperature measurement, operating the valve to prevent the kettle from overheating. The instrument also controls refrigerant flow while the kettle is charging, said to be impossible to do with single-action control based solely on the kettle bulb since the latter is not immersed until the kettle is partially filled.



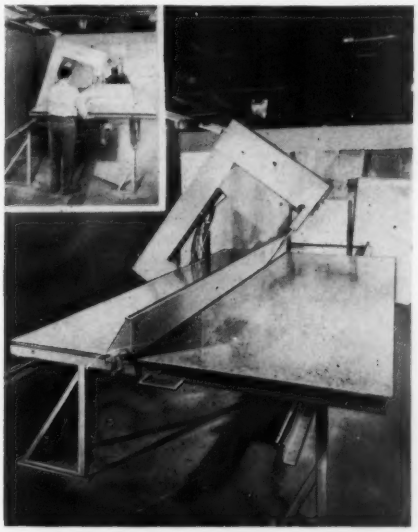
Claflin Air Blow and Spray Guns

For cleaning molds used for molding rubber and plastic products, the Bang-Pruf Air Blow Gun, manufactured by the C. A. Claflin Co., 15 Hathaway St., Boston 10, Mass., is so constructed that there are no springs or discs in the gun. It is constructed so that the valve stem and button are surrounded by a heavy wall of metal, thus giving protection against distortion and breakage. Every valve is ground in on its own seat and then hand-lapped. Air pressure keeps the valve closed and it is opened by slight pressure on the button or lever. The guns are supplied in a regular long nozzle, short type, lever type, bent nozzle, and hook nozzle.

In addition to the air blow guns, the company also manufactures air spray guns which are used for spraying mold lubricants on molds. According to the company, the spray guns are made without intricate parts which involve fine adjustment or minute orifices that easily clog. The gun is used where liquid is elevated or under low pressure. The air valve, normally closed under air pressure, is opened by a slight pull on the lever. There is a spring in back of the liquid valve and a further pull of the lever against the spring tension opens the liquid valve. The arrangement of valves is said to give greater leverage to the spring tension permitting the gun to be operated with a minimum effort. The recommended air operating pressure is 25 to 100 pounds.

Edge Foam Rubber Band Machine

The Frank Edge Saw Manufacturing Co., 549 Ottawa Ave., N. W., Grand Rapids, Mich., has announced the development of a new foam rubber band machine with an enlarged, over-sized bed or table surface, measuring 80 inches by 12 feet 2 inches in length. The machine features a truss supported, movable table surface made from a non-warping composition. The table is



varnished and rides with ball-bearing suspension on extended guide runners. The runners are supported by an adjustable frame assembly. According to the manufacturer, the machine can be used for cutting latex foam products, cellulose sponge, polyurethane foam, rubberized hair, fiber glass, and other like materials. Set-up time is said to be cut to a minimum and many costly jigs are eliminated with a resulting better operation.

Schutz-O'Neil Superfine Pulverizer

For grinding hard rubber, polyvinyl chloride and other materials to various degrees of fineness, Schutz-O'Neil Co., 311 Portland Ave., Minneapolis 15, Minn., has announced the development of a Superfine pulverizer which uses centrifugal forces and air currents to grind by shear and impact. The centrifugal force recirculates coarse particles within the mill for regrinding. The air classification carries the fine particles out of the mill as a uniform product of the desired particle size. According to the manufacturer, crystalline, granular, or fibrous materials can be handled with only minor modifications of beaters or liners. Product sizes attainable with the machine range from coarse to ultra-fine. The tailings, or material that is too coarse to be passed through the built-in classifier, are automatically returned to the grinding chamber until all particles are reduced to the proper degree of fineness. The setting of the cone and mill plate controls the separation between pulverized product and tailings. The design of the machine is said to permit grinding of heat-sensitive materials without refrigeration. Control of the air stream makes it possible to produce sub-sieve particles yet maintain grinding temperatures below 125 to 130°F.

Kentucky Color
AND CHEMICAL COMPANY, INC.
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CADMIUM REDS
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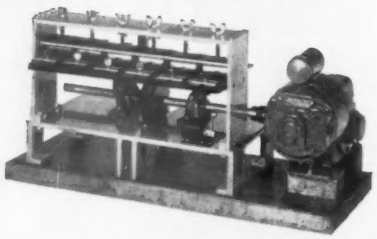
(for ASTM D1052)



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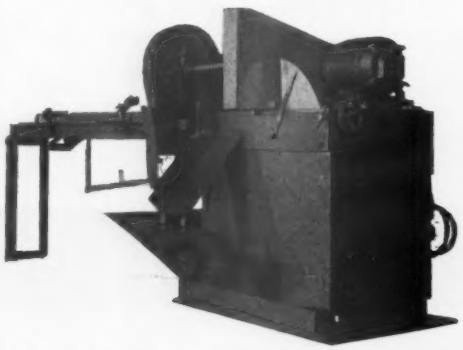

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Reviews

BOOKS

Accident Prevention Manual for Industrial Operations. (3rd Edition). Published by the National Safety Council, 425 North Michigan Ave., Chicago 11, Ill. 9 x 6 in. 1384 pp. $13.50.

Contained in this volume are 43 sections of industrial safety principles and background, technical data, and exposition of techniques for eliminating unsafe practices and unsafe conditions from the working scene. The content is intended to relate to all of industry, without presuming to give a solution to every specialized safety problem that might be encountered in any one industry or plant. It is not aimed to supplant the work of the specialist engineer. Rather, the manual is, as its title indicates, a technical reference for everyone responsible for job safety — a reference that provides information pertinent to application of engineering methods in eliminating hazards, and that affords guidance in the area of human relations affecting industrial safety. Typical subjects covered in the manual are: "Basics of Safety," "Removing the Hazard from the Job," "Human Behavior and Industrial Safety," "Workmen's Compensation, Public Liability, and Disability Benefits Insurance," "Industrial Hygiene," and "Safety Engineering Tables." Of interest to safety directors in the rubber industry are the sections devoted to the location and design of devulcanizers, vulcanizers and other machinery and apparatus used in the rubber industry. A subject index is provided.

•

The Chemistry of Phenolic Resins. By Robert W. Martin. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 6 x 9 in. 298 pp. $9.50.

This is the only detailed survey in English to cover both the chemistry of present-day phenolic resins and the chemistry of the related products which are available as more or less pure compounds. The book is written from the viewpoint of the organic chemist. At the same time, its author has had a great deal of experience with the problems encountered in dealing with the thermosetting resins. As a result, the work offers an unusual balance between theory and practice. Each major type of reaction of phenols with aldehydes and ketones is considered individually, and the available data are presented fully and systematically. Of considerable value to the researcher are the many tables showing structure, melting point, and pertinent references for the more important types of products. The coverage also includes many of the lesser known products. The book's unified picture of the chemistry of phenol-aldehyde and ketone products makes the location of research material easy and logical.

•

Industrial Wage and Salary Control. By Robert W. Gilmour. Published by John Wiley & Sons, 440 Fourth Ave., New York 16, N. Y. 6 x 9 in. 261 pp. $7.50.

Behind this book lies one of the most intensive studies ever made of the job analysis and evaluation programs of some of America's largest and most diversified companies. Using the findings of this study, the author discusses the application of advanced techniques in the important area of wage and salary control. His data is presented in a way that gives the book maximum usefulness for readers already in the field and for newcomers and students. The book gives an elaborate and detailed treatment of the point evaluation plan — the system which has wide acceptance in industry. Detailed, practical information is given on the development, installation and administration of the system. It is backed up at all points by actual examples drawn at first hand from industrial experience; a twenty-five job sample demonstrates the operation and significant characteristics of the system.

BOOKLETS, CATALOGS, etc.

E.N.I.: 1955. Published by the Italian Economic Corp., One Wall St., New York 5, N. Y. 9½ x 10½ in. 112 pp.

In the postwar period the Italian economy has risen at a fast and steady pace. By 1950 the national income had reached pre-war levels. Since then, its rate of increase has averaged five percent a year. A significant role in the stimulation of industrial development in the country has been played by natural gas, the output of which has risen sevenfold since 1950. The increase in the production and distribution of natural gas in Italy has been mainly due to the activity of a number of agencies and corporations, recently consolidated into a single public agency called E.N.I. (Ente Nazionale Idrocarburi). This book is intended to present a brief outline of the progress of E.N.I. and its affiliated companies. Answers as to what the organization is and how it operates are given in the book. The agency's exploitation of hydrocarbons, its natural gas pipelines, refineries, plants, and tanker fleet, in addition to its public relations and welfare activity are pointed out by text and illustrations.

•

Hypalon Synthetic Rubber. Elastomers Division, E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del. 8½ x 11 in. 8 pp.

This booklet is designed as an aid to the engineer in obtaining rubber products having improved physical properties and greater resistance to deterioration through the use of Hypalon, DuPont's chlorosulfonated polyethylene. To this end, the properties of Hypalon are described with attention given such matters as tensile strength, resilience, compression set, electrical characteristics, hardness, low temperature brittleness, thermal conductivity and colorability. Illustrated field service experiences show some of the extreme operating conditions under which Hypalon products have displayed exceptional durability. A useful chart shows those chemicals which have little or no effect upon the elastomer as well as those which have a moderate and a severe effect. Hypalon's resistance to abrasion is also discussed as is its resistance to flexing, flames, water, oils and greases.

•

Properties and Uses of Epolene Polyethylene Waxes. Eastman Chemical Products, Inc., Kingsport, Tenn. 8½ x 11 in. 26 pp.

All the important physical properties of the two types of Epolene, emulsifiable (E designation) and non-emulsifiable (N designation), are listed in this brochure along with comprehensive tables of their compatability with other synthetic waxes, natural waxes, resins, and dyes. The characteristics of these waxes are described in a series of graphs. Possible uses listed for the two types of wax include rubber compounding, printing inks, auto polishes, floor waxes, crayons, and leather dressings.

•

Use of G-E Silicone Mold Release Agents in Rubber Manufacturing. (Report AD 9-A). Silicone Products Department, General Electric Co., Waterford, N.Y. 8½ x 11 in. 8 pp.

Information on how to apply G-E silicone release agents in tire and mechanical rubber goods molding is given in this pamphlet. Data on handling methods with reference to hard water dilution, compatibility with other materials, corrosion inhibition, and application to molds are included. A brief description of the various types of release agents manufactured by the company, with their code numbers, is also given.

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REVIEWS (CONT'D)

This is Farrel-Birmingham. (Bulletin No. 59). Farrel-Birmingham Co., Inc., Ansonia, Conn. 8½ x 11 in. 44 pp.

This bulletin, with the aid of well-selected illustrations, gives a factual presentation of Farrel-Birmingham's ability to design and manufacture a variety of heavy machinery and machine tools in its four plants at Ansonia and Derby, Conn., and Buffalo and Rochester, N. Y. Sections of the booklet are devoted to facilities at each of the plants, the company's laboratories and products. In this latter category, units for rubber and plastics as well as for sugar and paper mills are described. Among recent developments in the rubber and plastics machinery field are a 4-roll "Z" calender and a 3-roll "Tri-angular" calender. Other products described include rolls, rolling mill machinery, hydraulic machinery, gears, gear units and gear machines, machine tools, castings, weldments, etc. A complete listing of company products is appended to the booklet.

•

PH and Conductivity Recorders and Controllers. (Catalog 1551). Minneapolis-Honeywill Regulator Co., Wayne and Windrim Avenues, Philadelphia 44, Penna. 8½ x 11 in. 20 pp.

Information about the latest equipment for measuring, indicating, recording and controlling the electrochemical variables: pH, Redox and conductivity, is offered in this catalog. The fundamentals of electrochemical instrumentation are reviewed, and basic systems are described. Among the instruments described are amplifiers and auxiliary equipment, sensing elements, typical installations and miniature instruments. A listing of the general specifications of Electronik potentiometers is included.

•

Dietert-Detroit Moisture Testing Equipment. (Bulletin No. SL-1). Harry W. Dietert Co., 9330 Roselawn Ave., Detroit 4, Mich. 8½ x 11 in. 12 pp.

Of interest to chemists, chemical engineers, physicists and others engaged in research, analysis and control, this catalog provides a complete list of the latest equipment for determining moisture in a number of materials. Included are illustrations and descriptions of every item needed for accurately analyzing the amount of moisture in any solid, granular, liquid or semi-liquid material. Listed are moisture tellers, speed ovens, desiccators and accessory items such as balances, weights, sample pans and drying dishes.

•

Surfa-Aero-Sealz: A Synthetic Rubber for Jet Aircraft Pavement. Naugatuck Chemical Division, U. S. Rubber Co., Naugatuck, Conn. 8½ x 11 in. 12 pp.

The use of synthetic rubber, blended with tar, to protect airfield pavements from the deteriorating effects of jet fuel spillage is described in this booklet. General procedures for applying the blend are outlined and specification requirements for tar-rubber blend for use as a binding agent in hot mix tar-rubber surface courses are given. Data on the latest findings on jet effects on asphalt pavement are included. Some information on test requirements, including preparation of the test sample, is also furnished.

•

Self-Aligning Roller Bearings. (Book No. 2658). Link-Belt Co., Prudential Plaza, Chicago 1, Ill. 8½ x 11 in. 8 pp.

Described in this booklet are adjustable single-row self-aligning roller bearings, adjustable double-row bearings, and pre-adjusted double-row self-aligning bearings. Engineering selection information, complete dimensional specifications and recommended fitting practices are included. Examples of bearing selection are given in five problems which list the type of application, desired life, speed, and shaft diameter. The solution to each problem is worked out showing the size of bearing to use in the particular application.

Picture Book of Eagle-Picher. Eagle-Picher Co., American Building, Cincinnati 1, Ohio. 8½ x 11 in. 48 pp.

This is an up-to-the-minute illustrated story of the diversified operations of the Eagle-Picher Co. While it was prepared for people in the company with the basic purpose of increasing their knowledge by giving them additional interest and pride in their positions, the booklet is also of interest to persons outside the company in that it presents, in some detail, a breakdown of the scope of the company's operations. Of interest is a section outlining the facilities and products of the Ohio Rubber Co., the Eagle-Picher division at Willoughby, Ohio. Photographs and text describe how various rubber products are made at Ohio Rubber's plants. Also of interest is the section devoted to the Chemical Division, many of whose products are consumed by Ohio Rubber and other rubber and plastics companies. This handsome publication also contains a listing of historical milestones in the life of the company through which it is possible to trace the growth of the concern from 1943 to the present.

•

The ABC's of Modern Plastics. Bakelite Division, Union Carbide & Carbon Corp., 300 Madison Ave., New York 17, N. Y. 8 x 6 in. 48 pp.

Included in this illustrated booklet are the basic facts on the sources and production of plastics and their spectacular growth and importance in everyday living. The booklet presents an account in laymen's language of the chemical wizardry behind modern plastics. The first five chapters deal with the why's and how's of plastics under such titles as: "What Are Plastics?", "How Are Plastics Made?", and "Where Are Plastics Used?". The Big Four of modern plastics, phenolic, vinyl, polystyrene and polyethylene, which supply more than two-thirds of all plastics materials made, are explored in greater detail in the last pages of the booklet. The important qualities, familiar uses, origins and resins are given for each of these materials in graphic and tabular form.

•

Tri-Homo Triple-Homogenization Disperser Homogenizer. Tri-Homo Corp., 102 Highland Ave., Salem, Mass. 8½ x 11 in. 16 pp.

The company's disperser and homogenizer units in all types and sizes are described in this interesting two-color bulletin. The units covered are widely used for processing liquid, wet or paste type products or wherever particle size reduction is required in a wet product. The bulletin offers complete specification data on units ranging from those manufactured with a ½ hp motor to sizes with motors up to 100 hp. Pertinent features of the units, such as "triple action" which produces the equivalent of three separate passes in a single operation, are fully described. The bulletin is illustrated with photographs and sectional drawings. Of interest is a partial list of manufacturers who are now using Tri-Homo homogenizer-dispersers in their operations.

•

Engineered Special Hazard Fire Protection. (Catalog No. 73). Automatic Sprinkler Corp. of America, Youngstown 1, Ohio. 8½ x 11 in. 28 pp.

This profusely illustrated catalog covers the various generally accepted methods of fire detection, fire prevention, fire control and fire extinguishment associated with the field of "special hazard" fire protection. Many of the hazardous conditions covered in this publication are common to many industries and thus, there is a great deal of information offered which will be of value to the rubber or plastics manufacturer. Also offered is a compilation of the latest devices and techniques of fire control as developed, engineered and installed by the company.

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MARKET REPORTS

TRENDS
NEWS
PRICES

NEW YORK, JUNE 1, 1956

Natural Rubber

Since our last report (April 30), the price of spot rubber on the New York Commodity Exchange has moved in a range of 475 points, high for the period being 31.25c reached on May 4, and low being 26.50c reached on May 31. The average price of spot rubber for the month of May was 29.61c based on 22 trading days. This compares with an average of 31.74c in the previous month.

World production of natural rubber totaled 127,500 long tons in March, 1956, compared with 140,000 long tons in March, 1955, according to estimates of the Secretariat of the International Rubber Study Group. Output in the first three months of this year was estimated at 402,500 long tons, down 8.5% from the 440,000 tons produced in the first three months of the preceding year.

World Consumption Down

World consumption of natural rubber was placed at 150,000 tons in March, 1956, compared with 160,000 long tons in March a year ago. Consumption totaled 475,000 long tons in the first three months of 1956, as against 460,000 long tons in the like period of 1955. Estimated imports into Russia and China included in these figures amounted to 11,600 long tons in March, 1956, 7,250 long tons in March, 1955, 45,000 long tons in January-March, 1956, and 15,000 long tons in January-March, 1955.

World stocks of natural rubber at the end of March, 1956, were placed at 805,000 long tons, down 82,500 long tons from the December 31, 1955, position. This amount consisted of 227,500 tons in producing countries, 402,500 in consuming countries—excluding Russian and Chinese stocks, and stocks in the United States and the United Kingdom — and 175,000 long tons afloat.

Natural Loses Position

Natural rubber has lost its tonnage position to synthetic rubber in the American economy, according to William S. Richardson, president of the B. F. Goodrich Co. "So far as we can look ahead," he said, "tree rubber will be the minority material, relinquishing the dominating position it has held so long in the United States.

"This change is due principally to increasing availability of American-made rubbers now that facilities for producing rubber are all in private, competitive hands, plus the continuing high selling price for crude rubber which reached a high of 52c a pound as recently as sixteen months ago." Prices of principal grades of synthetic rubbers have been selling at 23c a pound, he pointed out.

Meanwhile, the president of the Malayan Estate Owners Association has asked the government to open immediately for rubber cultivation 1,000,000 acres of land. He claimed that Malaya is not producing enough rubber and unless "we can produce sufficient natural rubber cheaply in the next ten years, synthetic will fill the gap once and for all." He estimated that there are 10,000,000 acres of land in Malaya available for the expanded cultivation of natural rubber.

Price Data

Closing Rubber Prices on New York Commodity Exchange (No. 1 R.S.S. Contract)

FROM MAY 1 TO MAY 31

May	Spot	May	July	Sept.	Dec.	Sales
1	30.25	29.50	29.75	29.70	29.50	143
2	30.50	29.85	30.20	29.95	29.70	109
3	30.50	30.00	30.30	30.10	29.75	126
4	31.25	30.60	30.80	30.50	30.25	275
5	....	....	....	....	....	....
6	....	....	....	....	....	....
7	31.00	30.26	30.60	30.20	30.00	115
8	30.37	29.85	30.00	29.70	29.40	189
9	30.13	29.70	29.76	29.46	29.25	96
10	30.25	29.90	30.00	29.70	29.50	154
11	30.25	29.85	30.00	29.65	29.45	59
12	....	....	....	....	....	....
13	....	....	....	....	....	....
14	30.25	29.60	29.90	29.25	28.75	314
15	30.37	29.85	30.10	29.40	28.95	141
16	30.61	30.10	30.40	29.55	28.98	274
17	30.25	29.60	29.75	28.95	28.50	293
18	30.00	29.15	29.40	28.70	28.20	140
19	....	....	....	....	....	....
20	....	....	....	....	....	....
21	29.61	28.65	28.90	28.22	27.85	83
22	29.61	28.75	29.05	28.35	28.05	135
23	29.13	28.40	28.65	27.95	27.55	150
24	28.13	27.30	27.45	26.90	26.25	339
25	27.61	27.30	27.25	26.55	25.90	152
26	....	....	....	....	....	....
27	....	....	....	....	....	....
28	27.50	26.90	27.05	26.40	25.85	192
29	27.25	....	26.55	26.15	25.35	217
30	....	....	....	....	....	....
31	26.50	....	25.90	25.40	24.70	193

Outside Market

No. 1 Ribbed Smoked Sheets:	
Spot	.26½
June	.26¼
July	.26
Thin Latex Crepe:	
Spot	.33½
Thin Brown Crepe, No. 2	.22½
Flat Bark Crepe	.17¼

London Market
(Standard Smoked Sheets)

July-Sept.	25.11 - 25.25
Oct.-Dec.	24.52 - 24.67

Singapore Market
(Standard Smoked Sheets)

June	25.10 - 25.18

Middling Upland Quotations

	Apr. 30	May 31		
	Close	High	Low	Close
July	33.94	34.59	34.38	34.59
Oct.	32.36	32.57	32.24	32.50
Dec.	32.38	32.65	32.36	32.60

Notes and Quotes

Technology, stemming from research, is the greatest competitive force ever seen, John R. Hoover, president of the B. F. Goodrich Co., stated recently. "Research deliberately causes obsolescence," Mr. Hoover said. "In this age, nothing is so certain as change, nothing is so perishable as an established product or process. There is no defense against the new idea except a better one." According to Mr. Hoover, planting and nourishing the seeds of research and using their fruits to ease man's burdens and improve his way of living are prime functions of industry. Mr. Hoover said that during the past three years about $15,000,000,000 have been spent for research and development in the United States. This is about 40% of the total business capital spending planned for 1956.

Synthetic Rubber

President Eisenhower's recent report to Congress on rubber has confirmed the existence of a growing foreign market for American-manufactured synthetic rubber. The special six-agency committee which drew up the report estimated the free world market for synthetic rubber would more than triple by 1960 to a potential requirement for approximately 600,000 long tons annually.

The importance of this new market to U. S. producers was underscored by the prediction that synthetic manufacturers will be in a position to meet the entire rubber demand in this country, including natural rubber, by 1958. Since natural is expected to hold its 35-40% share of the market here at home, American producers of synthetic are looking toward Europe, Latin America, Japan and other foreign outlets to absorb a substantial part of U.S. synthetic production.

The President's report was put together by officials of the Commerce, Defense, Interior and Treasury Departments, the Office of Defense Mobilization, the National Science Foundation and the staff of the Rubber Producing Facilities Disposal Commission.

Balancing World Supplies

The committee agreed that U. S. exports of synthetic rubber are becoming a new factor in balancing world supplies and requirements. Broadly, the picture shows a certainty of increased world dependence on synthetic rubber for the next ten years. Beyond that, if enough high-yield natural rubber is planted and comes into production, natural rubber can hope to recover a part of the position it will have meanwhile lost.

It was observed that the upward trend of world consumption will nevertheless apparently continue to make large use of synthetic rubber thereafter an economic necessity.

The committee came up with these figures on "potential foreign use of synthetics," except the Iron Curtain countries: 1956, 177,000 long tons; 1957, 274,000; 1958, 375,000; 1959, 482,000, and 1960, 597,000. U. S. exports of synthetic rubber this year are estimated at 120,000 to 150,000 long tons, or about 65-85% of the foreign market.

Outlook Particularly Good

The outlook for a continued high percentage participation will be particularly good for the next several years while countries like Germany, France, Italy, the United Kingdom and Japan put together synthetic rubber producing industries of their own. Current estimates of free world production, beginning in 1958, provide this picture: Canada, 100,000 long tons plus; United Kingdom, 50,000; Germany, 45,000; France, 25,000, Italy, 30,000, and Japan, 15,000.

The committee emphasized that there is no lack of know-how abroad, particularly with respect to tires, because most foreign plants are branches of leading U.S., U.K., French or Italian manufacturers.

CYANAMID RUBBER
Chem Lines

NO. 5
OF A SERIES

Published by AMERICAN CYANAMID COMPANY, Rubber Chemicals Department, Bound Brook, New Jersey

Thiazole Production Expands

It is gratifying to announce that equipment is now installed which will increase Cyanamid's production of Thiazoles.

The demand for these rubber accelerators, as shown in the chart below, has kept pace with the expansion of the rubber industry. This industry consumes Thiazole either in its basic form as mercaptobenzothiazole, or in its modified forms as benzothiazyl disulfide or the sulfenamides.

Cyanamid's latest expansion of its production facilities for these vital products has included the installation of new and better equipment, and the modernization of existing equipment. Thus, high quality standards will be maintained and enhanced.

One of the plus values to be derived will be an improved package for MBTS. While containing the same quantity of material as formerly, the new bag will be more compact. This will permit a much neater unit load and will give users the advantage of less storage space requirements – whether they purchase in unit loads or by the bag.

The nerve center of the new equipment is a central control panel. From this one point, the progress of Thiazole production can be controlled and charted. Elaborate precautions are taken to guard against impurities and to screen out any part of the product that does not meet Cyanamid's rigid specifications.

With the installation of this new equipment, Cyanamid will be in a position to meet the Thiazole requirements of all of its customers promptly.

For technical information on Cyanamid's Thiazole Accelerators, MBT and MBTS, write for Rubber Chemicals Technical Bulletin No. 839.

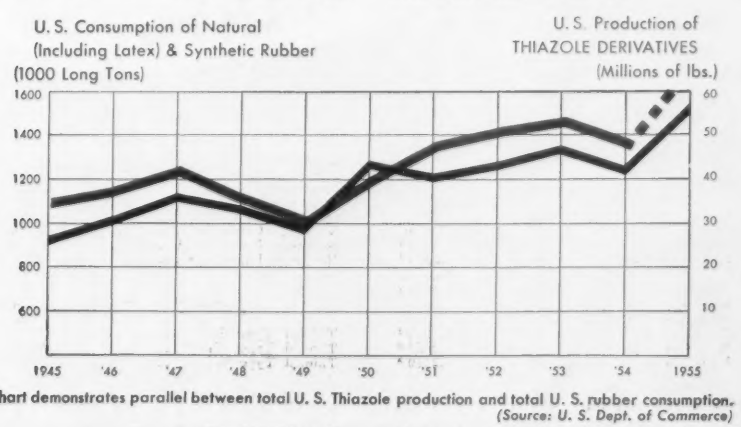
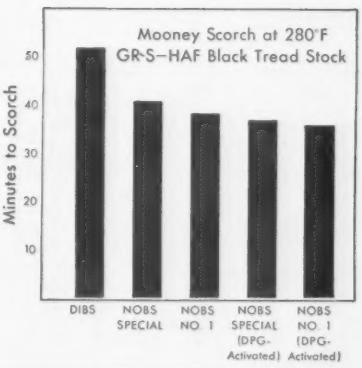


Chart demonstrates parallel between total U. S. Thiazole production and total U. S. rubber consumption. *(Source: U. S. Dept. of Commerce)*

Keeping Ahead of the Parade



The parade of progress in accelerators for vulcanization of rubber is steady and unceasing. It is not necessary to look back many years to witness the trend from guanadines to mercaptobenzothiazole, to benzothiazyl disulphide, to the sulfenamides, as primary accelerators for tire tread stocks. We have felt that our NOBS* SPECIAL Accelerator gives the ultimate in scorch protection and will handle the most severe problem.

Recently, we have heard the ominous rumblings that even more process safety is needed. High speed and high-pressure mixing equipment, higher extrusion speeds, the use of super abrasion fine particle size furnace blacks, and continually higher curing temperatures have all pointed to the need for a super delayed-action accelerator. Our newest product, DIBS* Accelerator, has been developed specifically for this need.

DIBS Accelerator is N,N-diisopropyl benzothiazole-2-sulfenamide. Its melting range of 131° to 139°F permits easy incorporation into furnace black stocks. DIBS has good storage stability under normal temperature conditions. At 268°F, DIBS gives decidedly more delayed action than NOBS SPECIAL as shown by the Mooney Scorch time.

We visualize the need for this new accelerator in tire treads, industrial belts, tank blocks and other mechanical goods in which super abrasion furnace blacks are or will be used. It will be useful in other stocks where the scorch problem is too great to be satisfactorily handled by the NOBS Accelerators. To prepare for this we are producing DIBS in semi-commercial quantities so that full-scale plant trials can be run by interested customers.

Write for sample of this new product and additional technical information contained in a Special Report.

*Trademark

PRICES OF COMMERCIALLY AVAILABLE SYNTHETIC RUBBER POLYMERS

(dry types—per pound carload unless otherwise specified)

Butadiene-Acrylonitrile Types

Butaprene NAA	.5400 [1]
Butaprene NF	.4900 [1]
Butaprene NL	.5000 [1]
Butaprene NXM	.5800 [1]
Chemigum N1	.6400 [3]
Chemigum N3	.5800 [3]
Chemigum N5	.5800 [3]
Chemigum N6	.5000 [3]
Chemigum N7	.5000 [3]
Hycar 1001	.5800 [3]
Hycar 1002	.5000 [3]
Hycar 1014	.6000 [3]
Hycar 1041	.5800 [3]
Hycar 1042	.5000 [3]
Hycar 1043	.5000 [3]
Hycar 1312	.6000 [3]
Hycar 1411	.6200 [3]
Hycar 1432	.5900 [3]
Hycar 1441	.6200 [3]
Paracril B	.5000 [3]
Paracril BJ	.5000 [3]
Paracril C	.5800 [3]
Polysar Krynac 800	.5000 [3]
Polysar Krynac 801	.5800 [3]
Polysar Krynac 802	.5000 [3]
Polysar Krynac 803	.5000 [3]
Naugapol 1018	.2700 [3]

Butadiene-Styrene Types

Ameripol 1001	.2410 [3]
Ameripol 1002	.2435 [3]
Ameripol 1006	.2410 [3]
Ameripol 1500	.2410 [3]
Ameripol 1501	.2410 [3]
Ameripol 1502	.2410 [3]
Ameripol 1703	.2060 [3]
Ameripol 1705	.2035 [3]
Ameripol 1706	.2035 [3]
Ameripol 1707	.1910 [3]
Ameripol 1709	.1885 [3]
Ameripol 1710	.1885 [3]
Ameripol 1711	.1885 [3]
Ameripol 1712	.1885 [3]
ASRC 1500	.2410 [3]
ASRC 1502	.2410 [3]
Baytown 1600	.1850 [3]
Baytown 1601	.1850 [3]
Baytown 1602	.1850 [3]
Baytown 1801	.1700 [3]
Copo 1500	.2410 [3]
Copo 1502	.2410 [3]
Copo 1712	.1885 [3]
FR-S 1000	.2300 [2]
FR-S 1001	.2300 [2]
FR-S 1004	.2300 [2]
FR-S 1006	.2300 [2]
FR-S 1009	.2600 [2]
FR-S 1010	.2650 [2]
FR-S 1012	.2700 [2]
FR-S 1013	.2600 [2]
FR-S 1015	.2800 [2]
FR-S 1500	.2300 [2]
FR-S 1502	.2300 [2]
FR-S 1703	.1950 [2]
FR-S 1705	.1925 [2]
FR-S 1710	.1775 [2]

Butadiene-Styrene (Cont'd)

Naugapol 1016	.2650 [3]
Naugapol 1018	.2700 [3]
Naugapol 1019	.2650 [3]
Naugapol 1021	.3000 [3]
Naugapol 1022	.2800 [3]
Naugapol 1023	.2850 [3]
Naugapol 1503	.2700 [3]
Naugapol 1504	.2950 [3]
Philprene 1000	.2425 [1]
Philprene 1001	.2425 [1]
Philprene 1006	.2425 [1]
Philprene 1009	.2550 [1]
Philprene 1018	.2700 [1]
Philprene 1019	.2650 [1]
Philprene 1500	.2425 [1]
Philprene 1502	.2425 [1]
Philprene 1503	.2700 [1]
Philprene 1601	.1920 [1]
Philprene 1605	.1880 [1]
Philprene 1703	.2075 [1]
Philprene 1706	.2040 [1]
Philprene 1708	.1970 [1]
Philprene 1712	.1890 [1]
Philprene 1803	.1730 [1]
Plioflex 1000	.2425 [3]
Plioflex 1006	.2425 [3]
Plioflex 1502	.2425 [3]
Plioflex 1703	.2075 [3]
Plioflex 1710	.1900 [3]
Polysar Krylene	.2410 [3]
Polysar Krylene NS	.2410 [3]
Polysar Krynol	.2000 [3]
Polysar Krynol NS	.2050 [3]
Polysar S	.2410 [3]
Polysar S-50	.2410 [3]
Polysar S-65	.2410 [3]
Polysar S-X 371	.2550 [3]
Polysar SS-250	.3000 [3]
S-1000	.2300 [3]
S-1001	.2300 [3]
S-1002	.2325 [3]
S-1006	.2300 [3]
S-1011	.2325 [3]
S-1013	.2300 [3]
S-1100	.1850 [3]
S-1500	.2300 [2]
S-1501	.2300 [2]
S-1502	.2300 [2]
S-1600	.1850 [2]
S-1601	.1850 [2]
S-1602	.1850 [2]
S-1703	.1950 [2]
S-1705	.1925 [2]
S-1706	.1925 [2]
S-1707	.1800 [2]
S-1709	.1775 [2]
S-1712	.1775 [2]
S-1801	.1700 [2]
S-2000	.2275 [2]
S-2101	.2250 [2]
Synpol 1000	.2425 [3]
Synpol 1001	.2425 [3]
Synpol 1002	.2450 [3]
Synpol 1006	.2425 [3]
Synpol 1007	.2425 [3]
Synpol 1009	.2475 [3]
Synpol 1012	.2425 [3]
Synpol 1013	.2500 [3]
Synpol 1500	.2425 [3]

Butadiene-Styrene (Cont'd)

Synpol 1501	.2425 [2]
Synpol 1703	.2075 [3]
Synpol 1707	.1925 [3]
Synpol 1708	.1950 [3]
Synpol 1711	.1900 [3]

Butyl Rubbers

Enjay Butyl 035	.2300 [3]
Enjay Butyl 150	.2300 [3]
Enjay Butyl 165 NS	.2400 [3]
Enjay Butyl 215	.2300 [3]
Enjay Butyl 217	.2300 [3]
Enjay Butyl 218	.2300 [3]
Enjay Butyl 268 NS	.2400 [3]
Enjay Butyl 325	.2300 [3]
Enjay Butyl 365 NS	.2400 [3]
Polysar Butyl 100	.2450 [3]
Polysar Butyl 101	.2775 [3]
Polysar Butyl 200	.2450 [3]
Polysar Butyl 300	.2450 [3]
Polysar Butyl 301	.2550 [3]
Polysar Butyl 400	.2450 [3]

Neoprene

	(prices l.c.l.)
Neoprene Types AC and CG	.5500 [3]
Neoprene Type GN	.4100 [3]
Neoprene Type GN-A	.4100 [3]
Neoprene Type GN-A-P	.3400 [3]
Neoprene Type GN-P	.3400 [2]
Neoprene Type GN-Special	.3400 [3]
Neoprene Type GN-A-Special	.3400 [2]
Neoprene Type GRT	.4200 [3]
Neoprene Type KNR	.7500 [3]
Neoprene Type S	.4200 [2]
Neoprene Type W	.3900 [2]
Neoprene Type WHV	.3900 [2]
Neoprene Type W-P	.3400 [2]
Neoprene Type W-Special	.3400 [2]
Neoprene Type WRT	.4500 [2]

Silicone Rubbers

	(prices l.c.l.)
GE (compounded)	2.50 [3]
GE Silicone Gum (not compounded)	4.00 [3]
Silastic (compounded)	1.95 [2]
Union Carbide (gums)	4.00 [3]
Union Carbide (compounds)	2.50 [3]

Polysulfide Rubbers

	(prices l.c.l.)
Thiokol Type A	.4700 [3]
Thiokol Type FA	.6400 [3]
Thiokol PR-1	.9500 [3]
Thiokol Type ST	1.00 [3]

(latices—all prices per pound dry weight)

Butadiene-Acrylonitrile Types

Butaprene N-300	.4600 [1]
Butaprene N-400	.5400 [1]
Butaprene N-401	.5400 [1]
Chemigum 200	.4900 [3]
Chemigum 235	.5400 [3]
Chemigum 236	.5400 [3]
Chemigum 245	.4600 [3]
Chemigum 246	.4600 [3]
Hycar 1512	.4600 [3]
Hycar 1551	.5400 [3]
Hycar 1552	.4600 [3]
Hycar 1561	.5400 [3]
Hycar 1562	.4600 [3]
Hycar 1571	.5900 [3]
Hycar 1572	.5100 [3]
Hycar 1577	.4600 [3]

Butadiene-Styrene Types

Copo 2101	.2800 [3]
Copo 2102	.3100 [3]

Butadiene-Styrene (Cont'd)

Copo 2105	.3100 [3]
Copo X-765	.2900 [3]
FR-S 2000	.2600 [2]
FR-S 2001	.2600 [2]
FR-S 2002	.2850 [2]
FR-S 2003	.2950 [2]
FR-S 2004	.2950 [2]
FR-S 2006	.2600 [2]
FR-S 2105	.3100 [2]
Pliolite 2101	.3000 [3]
Pliolite 2104	.3200 [3]
Pliolite 2105	.3200 [3]
Pliolite X-765	.3000 [3]
Naugatex 2000	.2630 [3]
Naugatex 2001	.2630 [3]
Naugatex 2002	.2880 [3]
Naugatex 2005	.3000 [3]
Naugatex 2006	.2630 [3]
Naugatex 2101	.2850 [3]

Butadiene-Styrene (Cont'd)

Naugatex 2105	.3120 [3]
Naugatex X-767	.3230 [3]
S 2004	.2600 [3]

Neoprene

Neoprene Latex 60	.4000 [3]
Neoprene Latex 571	.3700 [3]
Neoprene Latex 572	.3900 [3]
Neoprene Latex 601-A	.4000 [3]
Neoprene Latex 735	.3800 [3]
Neoprene Latex 736	.3800 [3]
Neoprene Latex 842-A	.3700 [3]
Neoprene Latex 950	.4700 [3]

Polysulfide Rubbers

Thiokol Type MX	.7000 [3]
Thiokol Type WD-2	.9200 [3]
Thiokol Type WD-6	.7000 [3]

Notes: (1) Freight allowed. (2) Freight extra. (3) Freight prepaid.

SIMPLEX
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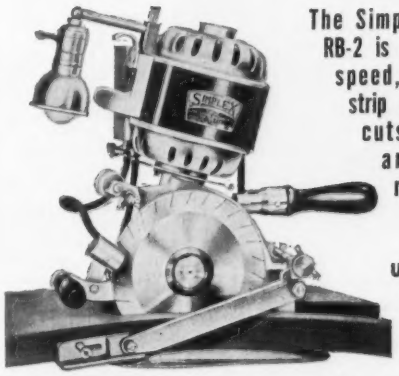
CUT 2500 FEET OF STRIP PER HOUR



The Simplex Model RB-2 is a new high speed, portable strip cutter that cuts efficiently and accurately.

U. S. Patent 2,294,497

The new Model RB-2 has a maximum cutting thickness of two inches, weighs 44.5 pounds, and is available in both A.C. and D.C. types. Manually operated, the machine is capable of cutting up to 20,000 feet of rubber strip in eight hours. A series of slits in the edge of the cutting blade carries water from a reservoir into the cut and not just to the top of the rubber being cut. This method lubricates the entire cut and produces a straight and even edge.

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MARKETS

(continued)

Reclaimed Rubber

Production of reclaimed rubber in the United States in the first three months of the current year has been set at 81,662 long tons by the U. S. Department of Commerce. This is about 1,500 long tons more than were produced in the first three months of the preceding year. Consumption in the first three months of the current year has been set at 78,272 long tons, only about 100 long tons less than in the first three months of 1955.

In the first three months of this year, the Commerce Department reports, a total of 2,497 long tons of reclaimed rubber were exported, almost paralleling the 2,126 long tons exported in the first three months of the previous year. As of the end of March, 1956, there were 33,954 long tons of reclaimed rubber on hand, compared with the 30,311 long tons in stocks as of March 31, 1955. The market during the past few weeks has been characterized as routine with prices remaining stable.

(Prices for All Areas Except Calif.)

	per lb.
Premium Grade Whole Tire	.11
First Line Whole Tire	.10½
Second Line Whole Tire	.10
Third Line Whole Tire	.09¼
Fourth Line Whole Tire	.09¼
Black Carcass	.14¼
No. 1 Light Colored Carcass	.20¼
No. 1 Peel	.11
Butyl Tube Reclaim	.15
Natural Rubber Black Tube	.15
Natural Rubber Red Tube	.21
Natural Rubber Gray Tube	.21

Scrap Rubber

The Bureau of the Census reports that scrap rubber exports in 1955 showed a sharp rise over shipments in the preceding year. Exports of scrap rubber last year came to 37,208,501 pounds valued at $1,288,343, as compared with 30,522,059 pounds valued at $763,228 in 1954. The year 1955 showed a gain of 6,686,442 pounds and $525,115 dollarwise. Imports of scrap rubber in 1955 totaled 25,423,023 pounds valued at $1,147,438, against 23,654,290 pounds worth $1,021,442 in the preceding year.

Quiet trading conditions have prevailed through the scrap rubber market throughout the past month. Most activity was centered about the filling of orders for mixed automobile tires. A bit more interest was noted in buffings. Current prices follow:

(Prices Delivered Akron)

Mixed tires	ton	17.00
Light colored carcass	lb.	.05½
No. 1 peelings	ton	45.00
No. 2 peelings	ton	30.00
No. 3 peelings	ton	21.00
Buffings	ton	16.00
Truck and Bus S.A.G.	ton	20.00
Passenger S.A.G.	ton	17.50
Natural Rubber Red Tubes	lb.	.07½
Natural Rubber Black Tubes	lb.	.06¼
Butyl Rubber Tubes	lb.	.04½

Tire Fabrics

According to the Commonwealth Economic Committee of London, world output of rayon in 1955 totaled 5,030,000,000 pounds, or 11% more than the previous peak of 4,250,000,000 pounds recorded in 1954. The 1955 total included 2,310,000,000 pounds of filament yarn and 2,720,000,000 pounds of staple fiber. This compares with 2,055,000,000 pounds of filament yarn and 2,465,000,000 pounds of staple fiber in 1954.

Output in the ten major producing countries—U.K., U.S., Italy, West Germany, Japan, France, the Netherlands, Spain, Belgium and Austria (staple fiber only), accounted for about 3,822,000,000 pounds (comprising 1,618,000,000 pounds of filament yarn and 1,805,000,000 pounds of staple fiber).

Rayon to Fight for Market

On the rayon front in the United States, a major rayon producer has warned the nylon industry that rayon would fight to keep its share of the market for automobile tire cord yarn by cutting prices further, if necessary, and, in fact, one such producer has announced a new 6c a pound cut in addition to the cuts announced recently.

I. Rogosin, chairman of Beaunit Mills, Inc., stated: "Nylon producers should be apprised of the fact that if they continue to reduce nylon prices in an attempt to take our business from us, we will not stand by without strong effort to keep the situation in balance." Mr. Rogosin said, however, that the price of rayon textile yarn would not be cut.

"Profits from the production of textile yarn by the rayon industry do not allow for any price reductions," he said. In recent weeks, both rayon and nylon producers have reduced prices sharply.

Cites Tire Cord Prices

In the case of tire cord yarn, Mr. Rogosin said his company felt it had to reduce prices to permit tire manufacturers to keep yarn tire costs 15% below the cost of tires utilizing nylon cord. In order to maintain the relatively lower cost of rayon tire yarn, he added, the rayon industry would have to eliminate any plants that are inefficient, continuing to operate only those that can be run profitably at full capacity.

Claude B. Morgan, president of Rayonier, Inc., also states that this is not the time to sell the rayon textiles industry short. Mr. Morgan notes that he does not share in the pessimism that has been expressed about the rayon industry. He predicted it would more than hold its own in the battle of the fibers.

(Prices f.o.b. Shipping Point)

Rayon Tire Cord

1100	lb.	.76
1650	lb.	.70
2200	lb.	.70½

Nylon Tire Cord

210	lb.	1.95
840	lb.	1.80

Rayon Graded Fabric

1100	lb.	.72
1650	lb.	.66½
2200	lb.	.66

Cotton Chafers

14.4 oz. (per square yard)	lb.	.70
9.25 oz. (per square yard)	lb.	.65
11.65 oz. (per square yard)	lb.	.61
8.9 oz. (per square yard)	lb.	.67

Liquid Latex

Natural: The natural latex market during the past month has been dull and has been characterized by the pressure of near supplies and the resistance of buyers to cover more than their immediate requirements. Interest has been very limited with many of the more important markets showing complete indifference to the further substantial fall in the price level or indeed to business at any price.

The shrinkage in general take-off is, in fact, becoming more and more marked and the experience of recent years suggests that there is now little likelihood of any improvement before early autumn. Current prices for Hevea latex, in bulk, average 33½c per pound at East Coast ports.

Synthetic: Production of S-type latex in the first three months of the current year has been put at 19,485 long tons, a bare 1,000 tons more than were produced in the first three months of the preceding year. Consumption of S-type latex in the first quarter of this year has been put at 17,814 long tons, some 2,500 long tons more than were consumed in the first quarter of the previous year. Stocks, as of March 31, 1956, totaled 6,851 long tons, almost paralleling the 6,940 long tons on hand on March 31, 1955.

In the first quarter of the current year, 2,560 long tons of neoprene latex were produced and 2,273 long tons consumed. In the first three months of the previous year, 2,268 were produced and 2,178 were consumed. N-type latex produced in the first three months of 1956 totaled 2,904 long tons and 2,133 long tons were consumed.

Cotton

The price of midding uplands on the New York Cotton Exchange has moved in the rather narrow range of 70 points since our last report (April 30), high for the period being 36.95c reached on May 11 and again on May 14, and low being 36.25c reached on May 21. The average price of middling uplands for the month of May was 36.65c based on 22 trading days. This compares with an average of 36.81c in April.

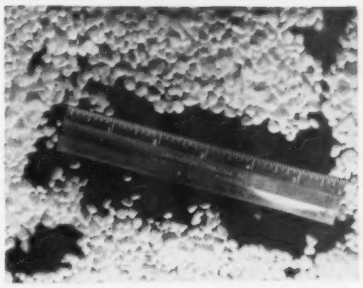
The House Foreign Affairs Committee has advised the administration to avoid future use of foreign aid which stimulates competition between American and foreign cotton and other farm products. The committee observed that it recently found such aid being used, for example, to assist Greek cotton crop output, even though that crop was being sold in world markets in competition with U. S. cotton.

Cotton producing countries of the International Cotton Advisory Committee have been urged to base their prices on U. S. export prices. In a statement on the world cotton situation, at the end of its 15th plenary session, ICAC pointed out that the new U. S. cotton export program, which in effect lowers world prices, would improve cotton's competitive position in end use markets.

World cotton production in the 1955-56 season is now estimated at 39,200,000 bales of 500 pounds gross, according to the Foreign Agricultural Service. This is a drop of 1,000,000 bales from the estimate made last January. Although still a record high, the new FAS figure is only slightly above previous record crops. FAS said the production decline was mainly due to unfavorable weather and insect damage in Egypt, India and the Soviet Union.

To Eliminate Dust and Cut Costs

IN NEOPRENE COMPOUNDING



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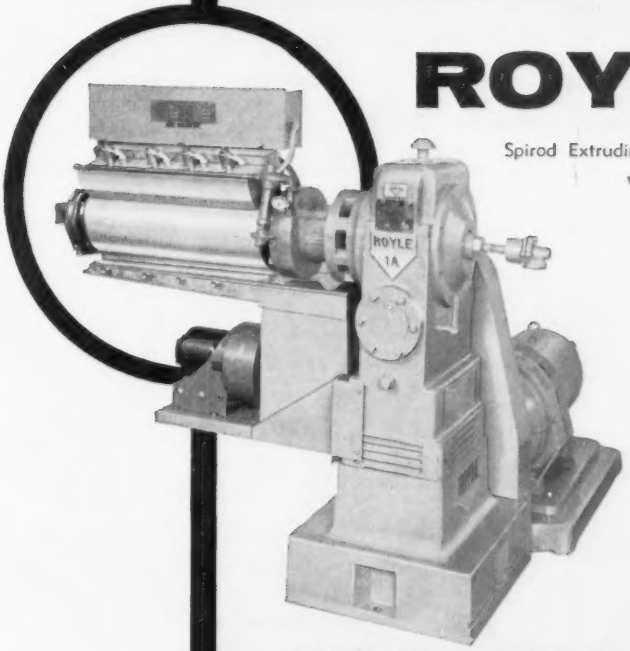

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MARKET PRICES

CHEMICALS & COMPOUNDING INGREDIENTS

JUNE 1, 1956

Prices are, in general, f.o.b. works and cover the domestic markets only. Export prices, as a rule, are usually slightly higher, due to packing regulations, special handling, etc.

Abbreviations: bbls., barrels; c.l., carload; cyl., cylinder; dlvd., delivered; dms., drums; eqld., equalized; l.c.l., less than carload; M.B. masterbatch; min., minimum; ref., refined; sap., saponified; sp., special; syn., synthetic; t.c., tank cars.

*Trademark. †For Export Only.

The arrangement of this section closely follows the Chemical Section of the 1955-56 RUBBER RED BOOK. Readers are referred to that edition for the correct classification of any material or brand name. Suppliers of every material are contacted for price information. However, only those materials are listed for which quotations have been furnished within the past six months. The quotations are not guaranteed and prospective purchasers should contact suppliers for information. Suppliers are requested to send current price information to the Market Editor, RUBBER AGE.

ACCELERATORS

A-1 (Thiocarbanilide)*	lb.	.72	.79
A-32*	lb.	.66	.80
A-100*	lb.	.52	.66
Accelerator No. 8*	lb.	—	1.10
Accelerator—49*	lb.	.55	.56
Accelerator 89*	lb.	—	1.20
Accelerator 108*	lb.	—	.90
Accelerator—552*	lb.	—	2.25
Accelerator—808*	lb.	.66	.68
Accelerator—833*	lb.	1.17	1.19
Accelerator B*	lb.	—	.89
Altax*	lb.	.50	.52
Ancap*(†)	lb.	.38	.40
Ancatax*(†)	lb.	.48	.50
Ancazate BU (ET & ME)*(†)	lb.	—	1.07
Ancazide ET*(†)	lb.	—	1.07
ME*(†)	lb.	—	1.14
Arazate*	lb.	—	2.25
Beutene*	lb.	.66	.68
Bismate, Rodform*	lb.	—	3.00
Butazate*	lb.	—	1.04
Butyl Eight*	lb.	1.10	1.35
Captax*	lb.	.40	.42
C-P-B*	lb.	—	1.95
Cumate, Rodform*	lb.	—	1.45
Diorthotolylguanidine	lb.	.60	.61
Diphenylguanidine	lb.	.50	.57
El-Sixty*	lb.	.58	.65
Ethazate*	lb.	—	1.04
50D*	lb.	—	.85
Ethyl Thiurad*	lb.	—	1.04
Ethyl Tuex*	lb.	—	1.04
Ethylac*	lb.	.93	.95
Guantal*	lb.	.58	.65
Harvex*	lb.	.70	.76
Hepteen Base*	lb.	—	1.85
Kure-Blend MT*	lb.	—	.70
Ledate, Rodform*	lb.	—	1.04
MBT-XXX*	lb.	.51	.53
Merac*	lb.	.75	1.05
Mercaptobenzothiazole	lb.	.40	.42
Mercaptobenzothiazyl Disulfide	lb.	.50	.52
Mertax*	lb.	.51	.58
Methazate*	lb.	—	1.04
Monex*	lb.	—	1.14
Mono Thiurad*	lb.	—	1.14
Morfex*	lb.	.65	.67
2-MT	lb.	—	1.00
NA-22* (for neoprene)	lb.	—	1.00
NOBS No. 1*	lb.	.72	.74
Special*	lb.	.77	.79
O-X-A-F	lb.	.51	.53
Pentex*	lb.	—	1.04
Flour*	lb.	—	.21
Permalux (Neoprene)*	lb.	—	2.17
Phenex*	lb.	.52	.57
Polyac*	lb.	—	1.80
R-2 Crystals*	lb.	—	4.35
Rotax*	lb.	.51	.53
RZ-50-A*	lb.	—	1.00
B*	lb.	—	1.00
SA 52*	lb.	—	1.14
SA 57*	lb.	—	1.04
SA 62*	lb.	—	1.04
SA 66*	lb.	—	4.25
SA 67*	lb.	—	1.04
SA 77*	lb.	—	1.04
Santocure*	lb.	.72	.79
NS*	lb.	.78	.85
Selenac* (Ethyl, Methyl)	lb.	—	4.25
Setsit-5*	lb.	.75	1.05
9*	lb.	.85	1.15
SPDX-GH*	lb.	.69	.71
GL*	lb.	1.20	1.30
Tellurac*	lb.	—	1.45
Tepidone*	lb.	.45	.48
Tetrone A*	lb.	—	1.91
Thiofide*	lb.	.50	.57
S*	lb.	.52	.59
Thionex*	lb.	—	1.14
Thiotax*	lb.	.40	.47
Thiurad*	lb.	—	1.14
Thiuram E*	lb.	—	1.04
M*	lb.	—	1.14
Trimene*	lb.	.56	.58
Base*	lb.	1.03	1.06
Triphenyl Guanidine	lb.	—	.90
Tuads* (Ethyl)	lb.	—	1.04
Tuads* (Methyl)	lb.	—	1.14
Tuex*	lb.	—	1.14
Ultex*	lb.	1.00	1.10
Unads*	lb.	—	1.14
Vulcacure NB*	lb.	—	.45
ZB*	lb.	—	.85
ZE*	lb.	—	.85
ZM*	lb.	—	.85
Z-B-X*	lb.	—	2.45
Zenite*	lb.	.50	.52
A*	lb.	.59	.61
Zenite Special*	lb.	.51	.53
Zetax* (uncoated)	lb.	.51	.53
Zimate* (Butyl)	lb.	—	1.04
Zimate* (Ethyl)	lb.	—	1.04
Zimate* (Methyl)	lb.	—	1.04

ACTIVATORS

Blue Lead Sublimed (dlvd.)	lb.	.17¼	.18¼
Cottonseed Fatty Acids			
Wochem 210*	lb.	—	.15¾
211*	lb.	—	.15¾
Fish Oil, Hydrogenated, Fatty Acid			
DAR-S* (dlvd.)	lb.	.12½	.14½
DAR-HY* (dlvd.)	lb.	.14¼	.16¼
Hydrofol Acids* (dlvd.)	lb.	.15¼	.17¼
Hyfac 430* (dlvd.)	lb.	.16¾	.18¾
Neo-Fat H.F.O.* (dlvd.)	lb.	.14½	.15¾
Neutrex* (dlvd.)	lb.	.15	.17
Stearex Beads* (dlvd.)	lb.	.09¾	.10¾
Stearite*	lb.	.12	.14
Talene* (dlvd.)	lb.	.15¼	.17¼
Lime, Hydrated			
Arrowhead*	ton	—	21.00
Marblehead*	ton	—	17.00
Sierra*	ton	—	22.50
Litharge			
Eagle-Picher* (l.c.l.)	lb.	.19	—
SB* (dlvd.)	lb.	—	.18½
Magnesium Oxide, Heavy			
General Magnesite 500*	lb.	.05	.05½
600*	lb.	.05½	.06
Kaiser 325*	lb.	.057	.073
Michigan No. 15*	lb.	.06	.06½
Magnesium Oxide, Light			
Baker's* (neoprene grade)	lb.	.25¼	.26
Carey Mag*	lb.	.25¼	.26
General Magnesite* (neoprene grade)	lb.	.30	.32
General Magnesite No. 101*	lb.	.25¼	.28
Genmag ML*	lb.	.25¼	.28
K & M* (neoprene grade)	lb.	.29¼	.30
Light Calcined Magnesia No. X-01*	lb.	.25¼	.26

ACTIVATORS (Cont'd)

Magnesium Oxide, Light (cont'd)			
Light Carbonate of Magnesia, Technical	lb.	.10½	.12
Maglite D*	lb.	.25¼	.26
L and M*	lb.	.29¼	.30
Marine's* (neoprene grade) (l.c.l.)	lb.	.29¼	.30
Michigan No. 30*	lb.	.25¼	.26
Neomag Powder*	lb.	.29¼	.30
Pellets*	lb.	.31¼	.32
Michigan No. 40*	lb.	.29¼	.30
Oleic Acid			
Emersol 210* (dlvd.)	lb.	.18½	.20½
Groco Red Oil*	lb.	.18½	.20½
Neo-Fat 92-04*	lb.	.20½	.22½
94-04*	lb.	.18½	.20½
Wochem 310, 311	lb.	—	.18½
Palm Fatty Acids			
Groco 45*	lb.	.14¾	.16¾
Wochem 280*	lb.	—	.14¾
281*	lb.	—	.14¾
Potassium Oleate (dms.)	lb.	.30	.73
Red Lead			
Eagle-Picher* (l.c.l.)	lb.	.20	—
No. 2 RM* (dlvd.)	lb.	—	.18½
Sodium Laurate, 75%	lb.	.64	.89
Sodium Oleate, 75%	lb.	.54	.79
Paste (dms.)	lb.	.39	.64
Sodium Stearate, 75%	lb.	.54	.89
Stearic Acid, Single Pressed			
Emersol 110* (dlvd.)	lb.	.14¾	.16¾
Groco 53*	lb.	.14¾	.16¾
Neo-Fat 18-53*	lb.	.14¾	.16¾
Standard Pearlstearic* (dlvd.)	lb.	.14¼	.16¼
Wochem 730*	lb.	—	.12½
Stearex B* (dlvd.)	lb.	.15½	.16¾
Stearic Acid, Double Pressed			
Choice Pearlstearic* (dlvd.)	lb.	.15¾	.17¼
Emersol 120* (dlvd.)	lb.	.15¾	.17¼
Groco 54*	lb.	.15¾	.17¼
Hydrofol Acid 51RG	lb.	.12½	.14½
Neo-Fat 18-54*	lb.	.15¼	.17¼
Wochem 731*	lb.	—	.13¾
Stearic Acid, Other			
Extra Pearlstearic* (dlvd.)	lb.	.17½	.19½
Groco*	lb.	.12	.14
Neo-Fat 18*	lb.	.17½	.18½
18-58*	lb.	.12	.13
18-61*	lb.	.15¼	.16¼
Stearite*	lb.	.12½	.14½
Wochem 720*	lb.	—	.11¾
721*	lb.	—	.11¾
732*	lb.	—	.14¾
White Lead Basic Carbonate	lb.	.19	.20
White Lead Basic Sulfate	lb.	.17¼	.18¼
Zinc Laurate			
Laurex*	lb.	.33	.34
Zinc Stearate	lb.	.39	.44
Aquazinc K.C.*	lb.	.30	.55
Crown Brand*	lb.	.39	.44

Unclassified Activators

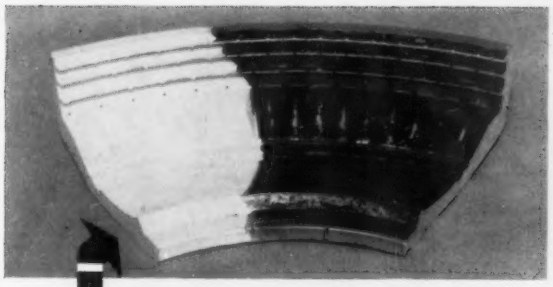
Actifat* (dms.)	lb.	—	.18
Aktone*	lb.	.21¼	.23¾
Barak*	lb.	—	.62
Curade*	lb.	.57	.59
Dibenzo G-M-F	lb.	—	2.60
D-B-A*	lb.	—	1.95
G-M-F*	lb.	—	2.60
Dibutylamine (dlvd.)	lb.	.55	.56
MODX*	lb.	.32½	.34½
Neo Fat 42-07*	lb.	.10¼	.12¼
Ridacto* (dms.)	lb.	.25	.26
Snodotte* (dlvd.)	lb.	.19	.21
Vulklor*	lb.	.88	.98

ANTI-COAGULANTS

Aqua Ammonia* (dms.)	lb.	.031	.035
M.B.M.* (l.c.l.)	lb.	—	.35

ANTI-FOAMING AGENTS

Aero Anti Foam H*	lb.	—	.20
Regular*	lb.	—	.12
Anhydrol 6991*	lb.	.51	.56
D.C. Antifoam A*	lb.	5.45	6.65
Antifoam A Emulsion*	lb.	2.05	4.00
Antifoam AF Emulsion*	lb.	2.05	2.85
Defoama W-1701*	lb.	—	.12½
Defoamer A-25*	lb.	—	3.00
Defoamer 630*	lb.	—	.12½
Deltyl Prime	lb.	.70	.80



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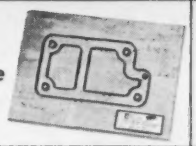
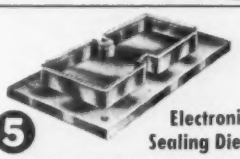
Gang Dies Our Specialty

3 Mallet Handle Dies

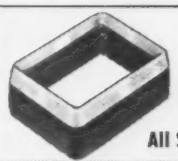


4 Steel Rule Cutting Dies

2 Steel Rule Clicker Dies



5 Electronic Sealing Dies



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ANTI-FOAMING AGENTS (Cont'd)

G-E Antifoam SS-24*	lb.	5.30	6.65
SS-60*	lb.	2.05	3.75
SS-66*	lb.	5.30	6.65
Kessco X-3* (dms.)	lb.	——	.35
X-180*	lb.	——	.29¾
X-181*	lb.	——	.38½
Nopco 1407*	lb.	.19½	.20½
1497-V*	lb.	.13¼	.14¼
1907-B*	lb.	.18¼	.19¼
JMK*	lb.	.48	.49
JMU*	lb.	.22½	.23½
JMY*	lb.	.19¼	.20¼
Pluronic L61*	lb.	.33½	.39
RS-968*	lb.	.38	.38½
Terpinol Prime No. 1	lb.	.35	.50
Tributyl Phosphate (dms.)	lb.	.52	.53

ANTIOXIDANTS

Agebest 1293-22A*	lb.	1.90	2.00
AgeRite Alba*	lb.	2.35	2.45
Gel*	lb.	.64	.66
Hipar*	lb.	.98	1.00
H.P.*	lb.	.72	.74
Powder*	lb.	.52	.54
Resin*	lb.	.75	.77
Resin D*	lb.	.52	.54
Spar*	lb.	.52	.54
Stalite*	lb.	.52	.54
Stalite S*	lb.	.52	.54
Superlite*	lb.	.52	.54
White*	lb.	1.45	1.55
Akroflex C*	lb.	.77	.79
CD*	lb.	.72	.74
Aminox*	lb.	.52	.54
Antioxidant 425*	lb.	2.47	2.50
Antioxidant 2246*	lb.	1.50	1.53
Antox*	lb.	.52	.54
Aranox*	lb.	——	3.25
Benzoquinone	lb.	1.50	1.75
Betanox Special*	lb.	.80	.82
B-L-E*	lb.	.52	.54
B-X-A*	lb.	.52	.54
Deenax*	lb.	.95	1.05
Di-tert-Butyl-para-Cresol	lb.	.91	.95
Eugenol C-95%*	lb.	2.30	2.50
Flectol H*	lb.	.52	.59
Flexamine*	lb.	.72	.74
Ionol* (dms.)	lb.	.91	.95
Neozone A*	lb.	.56	.58
C*	lb.	——	.80
D*	lb.	.52	.54
Nullapon BF-12*	lb.	——	.21½
BF-13*	lb.	——	.29
BF-78*	lb.	——	.62
BF-Acid*	lb.	——	.97½
Octamine*	lb.	.52	.54
Oxidex*	lb.	——	3.60
PDA-10*	lb.	.46	.48
Permalux*	lb.	——	2.17
Polygard*	lb.	.52	.54
Santoflex AW*	lb.	.78	.85
DD*	lb.	.52	.59
75*	lb.	.92	.99
Santovar-A*	lb.	1.50	1.57
Santowhite Crystals*	lb.	1.60	1.67
Santowhite L*	lb.	.52	.59
MK*	lb.	1.29	1.36
Powder*	lb.	1.60	1.67
Sequestrene AA*	lb.	——	.97½
NA2*	lb.	——	.79½
NA3*	lb.	——	.77½
Stabilite*	lb.	.55	.57
Alba*	lb.	.72	.77
FLX*	lb.	——	.65
L*	lb.	.60	.62
White*	lb.	.52	.54
White Powder*	lb.	.41	.43
Stabilizer No. 1*	lb.	1.55	1.80
Stabilizer No. 9-A*	lb.	.80	1.05
Styphen I*	lb.	.51	.55
Sunolite*	lb.	.16	.22
Tannic Acid, Tech.	lb.	.46	.48
Thermoflex A*	lb.	.98	1.00
V-G-B*	lb.	.70	.72
Wing-Stay S*	lb.	.51	.53

ANTI-SCORCHING AGENTS

Armeen HT*	lb.	.36	.40
Good-rite Vultrol*	lb.	.62	.64
Harcopol 1183*	lb.	.70	.74
Retarder W*	lb.	——	.45
Sodium Acetate 60-62% Crystals	lb.	.08	.08½

ANTISEPTICS AND GERMICIDES

A.P.C. 6901*	lb.	.32	.38
Arquad S*	lb.	.24	.26
Formaldehyde (dms.)	lb.	.06	.076
G-4* (bbls.)	lb.	1.09	1.29
G-11*	lb.	1.98	2.08
Halane*	lb.	.50	.60
Ortho Cresol (26°—27°)	lb.	.14	.156
Retarder D*	lb.	.42	.50
Soligen Drier—Copper 8%* (dms.)	lb.	.20¼	.21½
Zinc 8%* (dms.)	lb.	.22¼	.23½
Vancide*	lb.	——	.80

ANTI-WEBBING AGENTS (for Latex)

DC 7 Compound*	lb.	5.13	6.50
Webnix 34*	lb.	1.25	2.25

AROMATICS (DEODORANTS)

Airkem 115*	gal.	——	6.50
122*	gal.	——	6.50
186*	gal.	——	6.50
Alamask AA*	lb.	——	3.00
AF*	lb.	——	2.50
AO*	lb.	——	1.50
AR*	lb.	——	.50
BG*	lb.	——	1.15
BGM*	lb.	——	.60
CY*	lb.	——	2.40
DI*	lb.	——	3.35
DL*	lb.	——	1.95
H*	lb.	——	5.50
LD*	lb.	——	.75
ND*	lb.	——	2.75
O*	lb.	——	6.50
OS*	lb.	——	5.25
Bouquet 149*	lb.	——	3.00
Coumarin*	lb.	2.95	3.00
Curodex 19*	lb.	4.75	4.90
188*	lb.	5.75	5.90
198*	lb.	6.75	6.90
Deodorant 65*	lb.	——	1.85
Deodorant L-37*	lb.	2.15	2.25
L-44*	lb.	2.65	2.75
N.L.T.X.*	lb.	1.90	2.00
Deodorant Oil GD 6422*	lb.	1.90	2.20
GD 6423*	lb.	1.60	1.90
GD 6575*	lb.	2.40	2.90
GD 31063*	lb.	2.25	2.75
Ethavan*	lb.	6.75	6.80
Latex Perfume 5*	lb.	——	3.25
6*	lb.	——	7.50
9*	lb.	——	1.25
Naugaromes* (dms.)	lb.	.60	3.00
Neutroleum Delta*	lb.	——	2.60
Gamma*	lb.	——	3.60
Parador A*	lb.	1.80	2.10
C*	lb.	2.00	2.50
E*	lb.	.25	.40
GD 5280*	lb.	2.00	2.50
GD 53481*	lb.	1.70	2.00
Perfume Oil Bouquet Vanilla M*	lb.	1.60	1.70
Rodo No. 0*	lb.	4.00	4.50
No. 10*	lb.	5.00	5.50
Rubbarome* (dms.)	lb.	.60	3.80
Rubber Perfume 12*	lb.	——	4.35
Russian Leather 7*	lb.	——	4.35
Vanillin	lb.	3.00	3.25

BLOWING AGENTS

Ammonium Bicarbonate	cwt.	——	8.00
Better Blend Soda* (c.l., bags)	cwt.	——	2.40
Blowing Agent CP-975*	lb.	.32	.35
Celogen*	lb.	——	1.95
AZ*	lb.	——	1.95
Diazo Amino Benzine	lb.	——	.73
Neo Fat 42-12*	lb.	.10¼	.12¼
Sodium Bicarbonate, U.S.P. (c.l., bags)	cwt.	——	2.30
Sponge Paste*	lb.	——	.20
Unicel ND*	lb.	——	.76
S*	lb.	——	.20
Urea	lb.	.06	.07

BONDING AGENTS

Base 6986*	lb.	.27	.32
Braze*	gal.	6.00	9.00
Cover Cement*	gal.	2.50	4.00
Durez 12987*	lb.	——	.54
Gen-Tac Latex*	lb.	.75	.85½
Hylene M*	lb.	3.50	3.75
M-50*	lb.	1.90	2.15
Penacolite B1A*	lb.	——	.95
R-2710*	lb.	——	.95
Pliobond 20*	gal.	2.91	4.23
30*	gal.	3.65	4.97
Rex Compounds*	gal.	1.30	1.90
Thixons*	gal.	3.30	9.00
Ty-Ply Q (BN & S)*	gal.	6.75	8.00
Tygobond 30*	gal.	5.50	7.45

COAGULANTS

Acetic Acid—56% (bbls.)	cwt.	9.91	11.00
Glacial 99½% (dms.)	lb.	.12	.13
Calcium Nitrate, Tech. Flake	lb.	.12½	.15
Hydroxyacetic Acid—70% (dms.)	lb.	——	.084
Zinc Nitrate, Tech. Flake	lb.	——	.22½

COLORING AGENTS

Black

Aquablak B*	lb.	.09¾	.10¼
M*	lb.	.10½	.11
R*	lb.	.10¾	.11¼
S*	lb.	.11¾	.12¼
Black Shield 4-35* (dms.)	lb.	——	.09
No. 5	lb.	——	.093
No. 6	lb.	——	.08
No. 14	lb.	——	.11
Carbon Black See *Reinforcing Agents*			
Lampblack No. 10*	lb.	.06	.09
Mapico Black Iron Oxide* (50 lb. bags)	lb.	.14¼	.14½
Pure Black Iron Oxide	lb.	.14¼	.14½

COLORING AGENTS (Cont'd)

Blue

Blue Powders	lb.	2.20	3.75
Cooke M.B. Blue*	lb.	2.45	2.85
Milori Blue*	lb.	——	.52
Monastral Rubber Blue CPL*	lb.	——	1.95
PCD, Dispersed*	lb.	——	2.20
Peacoline Blue*	lb.	——	3.85
Ramapo Blue*	lb.	2.75	3.00
Rubber Blue GD* (Disp.)	lb.	——	4.55
Rubber Blue X-1999*	lb.	——	1.80
Rubber Dispersed Blues	lb.	2.52	2.78
Syntheline Blue*	lb.	——	3.85
Stan-Tone MBS*	lb.	1.55	4.55
GPE*	lb.	——	2.50
PC*	lb.	1.40	1.80
Ultramarine	lb.	.14	.30
Vansul Blue M.B.*	lb.	.95	2.60

Brown

Brown Iron Oxide	lb.	.15¼	.15½
Mapico Brown* (50 lb. bags)	lb.	.15¼	.15½
Stan-Tone GPE*	lb.	——	3.00
Vansul Brown M.B.* (Organic)	lb.	——	2.15

Green

Cooke M.B. Green*	lb.	1.60	2.80
Filo Green*	lb.	——	.34
Green Chromium Oxide, Pure	lb.	——	.42½
Green Chromium Oxide, Pure Hydrated	lb.	——	1.15
Green Powders	lb.	1.35	3.95
Monastral Rubber Green GSD* (Dispersed)	lb.	——	2.66
GSL*	lb.	——	2.20
Permansa Green CP-594*	lb.	——	1.35
Pigment Green B*	lb.	——	1.35
GL-652D*	lb.	.90	1.00
Ramapo Green*	lb.	——	3.50
Rubber Dispersed Greens	lb.	1.23	3.08
Rubber Green FD* (Disp.)	lb.	——	2.05
Rubber Green X-1292*	lb.	——	1.55
Stan-Tone MBS*	lb.	1.55	3.35
GPE*	lb.	3.00	4.50
PC*	lb.	1.70	3.80
Vansul Green M.B.*	lb.	1.05	2.90

Maroon

Maroon Powders	lb.	.79	3.60
Vansul Maroon M.B.*	lb.	——	3.35

Orange

Mercadium X-2667*	lb.	——	1.78
Molybdate Orange	lb.	——	.46½
Oswego Orange X2065*	lb.	——	3.00
Rubber Orange OD* (Disp.)	lb.	——	2.25
Stan-Tone Cadmium Dry*	lb.	2.02	4.45
Cadmium Paste*	lb.	2.47	3.20
GPE*	lb.	1.20	4.35
PC*	lb.	.75	2.75
Vansul Orange M.B.*	lb.	2.40	2.45

Red

Antimony Trisulfide	lb.	.72	.78
R.M.P. Sulfur Free*	lb.	——	.78
R.M.P. No. 3*	lb.	——	.72
Cadmolith Red* (dms.)	lb.	2.37	3.82
Cooke M.B. Red*	lb.	1.05	3.25
Graphic Red (dlvd.)	lb.	——	.79
Indian Red, American, Pure*	lb.	.13¾	.14
Doxco (English)*	lb.	.11½	.11¾
Kroma Reds*	lb.	.14	.15
Mapico Reds* (50 lb. bags)	lb.	.13¾	.14
Mercadium X-2668 Light*	lb.	——	1.95
X-2669 Medium Light*	lb.	——	2.10
X-2670 Medium*	lb.	——	2.25
X-2671 Dark*	lb.	——	2.40
Oximony Red Iron Oxide	lb.	.12¾	.13
Reeco Red Oxide*	lb.	.12	.13
Red Iron Oxide, Light	lb.	.13¾	.14
Red Powders	lb.	——	4.40
Rubber Dispersed Reds	lb.	1.47	3.58
Rubber Red PBD* (Disp.)	lb.	——	1.75
2BD, Dispersed*	lb.	——	1.80
2BL*	lb.	——	1.24
PBL*	lb.	——	1.65
Rubanox Red CP-762* (dlvd.)	lb.	——	1.40
Rubber Red CP-339* (dlvd.)	lb.	——	1.10
Rubber Red X-1148*	lb.	——	.88
Solfast Red*	lb.	1.50	1.95
Stan-Tone MBS*	lb.	1.20	3.53
GPE*	lb.	1.65	2.00
PC*	lb.	1.30	2.50
PDS*	lb.	1.40	1.55
PVC*	lb.	1.65	1.90
Sun Burnt Red*	lb.	.11½	.11¾
Vansul Red M.B.*	lb.	1.00	3.35
Watchung Red*	lb.	1.65	1.95

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COLORING AGENTS (Cont'd)

Tan

Mapico Tan 15* (50 lb. bags)	lb.	.20¼ -	.21
20* (50 lb. bags)	lb.	.20¼ -	.20½

White—Lithopone

Albalith*	lb.	.0800 -	.0975
Eagle-Picher*	lb.	.0800 -	.0975
Permolith*	lb.	.0800 -	.0975
Sunolith*	lb.	.0800 -	.0875

White—Titanium Pigments

Stan-Tone PC*	lb.	— -	.55
Ti-Cal*	lb.	.09 -	.09¾
R-25*, R-22*, R-27*, R-30*	lb.	.09 -	.09½
R-60*	lb.	.09¼ -	.09¾
Ti-Pure*	lb.	.24½ -	.27½
Anatase Grades*	lb.	.24½ -	.25½
Rutile Grades*	lb.	.26½ -	.27½
Titanox A*—all grades (dlvd.)	lb.	.24½ -	.25½
C-50* (dlvd.)	lb.	.13⅜ -	.14⅜
RA* (dlvd.)	lb.	.26½ -	.27½
RA-10* (dlvd.)	lb.	.26½ -	.27½
RA-NC* (dlvd.)	lb.	.26½ -	.27½
RC* (dlvd.)	lb.	.09¼ -	.09¾
RC-HT* (dlvd.)	lb.	.09 -	.09½
Unitane O-110*	lb.	— -	.245
O-220*	lb.	— -	.245
O-310*	lb.	— -	.245
O-410*	lb.	— -	.265
OR-150*	lb.	— -	.265
OR-250*	lb.	— -	.265
OR-340*	lb.	— -	.265
OR-342*	lb.	— -	.265
OR-350*	lb.	— -	.265
OR-540*	lb.	— -	.265
OR-640*	lb.	— -	.265
Zonaque*	lb.	.24½ -	.25½
R*	lb.	.26½ -	.27½

White—Zinc Oxide (American Process)

AZO-ZZZ 11* (22*, 33*, 44*, 55*)	lb.	.1450 -	.1550
Eagle-Picher AAA*	lb.	.1450 -	.1550
Horse Head Special*	lb.	.1450 -	.1550
XX*	lb.	.1450 -	.1550
Protox 166*	lb.	.1450 -	.1550
167*	lb.	.1450 -	.1550
267* (pelleted)	lb.	.1450 -	.1550
St. Joes Black Label*	lb.	.1450 -	.1550
Green Label*	lb.	.1450 -	.1550
Red Label*	lb.	.1450 -	.1550

White—Zinc Oxide (Dispersed)

Dispersed Zinc Oxide	lb.	— -	.13

White—Zinc Oxide (French Process)

AZO-ZZZ 66	lb.	.1450 -	.1550
Florence Green Seal*	lb.	.1625 -	.1725
Red Seal*	lb.	.1575 -	.1675
White Seal*	lb.	.1675 -	.1775
Kadox 25*	lb.	.1675 -	.1775
15*, 17*, 72* & 515	lb.	.1450 -	.1550
Protox 168*	lb.	.1450 -	.1550
169*	lb.	.1450 -	.1550
268* (pelleted)	lb.	.1450 -	.1550
U.S.P. (cartons)	lb.	.1775 -	.1875
XX-78* (l.c.l.)	lb.	— -	.15½

White—Zinc Sulfide

Cryptone ZS*	lb.	.2530 -	.2630

Yellow

Benzidine Yellow	lb.	2.10 -	2.35
Cadmolith Yellow* (dms.)	lb.	1.20 -	—
Chrome Yellow	lb.	— -	.33½
Cooke M.B. Yellow 405*	lb.	2.15 -	2.75
Iron Oxide, Pure			
Light Shades	lb.	.12 -	.12¼
Dark Shades	lb.	.11½ -	.11¾
Mapico Yellow* (50 lb. bags)	lb.	.12 -	.12¼
Rubber Dispersed Yellows	lb.	1.27 -	2.13
Rubber Yellow GD* (disp.)	lb.	— -	2.15
GL*	lb.	— -	2.05
Rubber Yellow X-1940*	lb.	— -	2.35
Stan-Tone Cadmium Dry*	lb.	2.80 -	3.03
Cadmium Paste*	lb.	1.63 -	1.99
MBS*	lb.	1.30 -	2.20
GPE*	lb.	4.25 -	4.50
PC*	lb.	.55 -	3.40
Sumatra Yellow X-1940*	lb.	— -	2.35
Toluidine Yellow	lb.	2.00 -	2.10
YL-660 D*	lb.	1.20 -	1.25
Oximony Iron Oxide	lb.	.12¾ -	.13
Vansul Yellow M.B.*	lb.	1.00 -	2.00
Yellow Powders	lb.	2.00 -	5.00
Zinc Yellow	lb.	— -	.27½

DISPERSING AGENTS

Anchoid*(†)	lb.	.24 -	.25
Anhydrapent*	lb.	.56 -	.59
Armeen 18*	lb.	.38 -	.40

DISPERSING AGENTS (Cont'd)

Blancol*	lb.	— -	.15¾
Darvan No. 1* (and No. 2*)	lb.	.22 -	.30
Daxad 11* (21*, 23*)	lb.	.08 -	.30
Diethanolamine (dms., dlvd.)	lb.	.24½ -	.27½
Dispersaid*	lb.	1.25 -	1.35
Emcol K-8300* (dms.)	lb.	.14 -	.18
P10-59	lb.	.32 -	—
5120	lb.	.31 -	—
5138	lb.	.31 -	—
Emulphor ON-870*	lb.	— -	.55
Furala*	lb.	.06½ -	.07½
Halloid*	lb.	.04½ -	.05½
Hycryl A-1000*	lb.	— -	.148
Igepal CO-630*	lb.	— -	.29
Igepon T-73*	lb.	— -	.29½
Kyro EO* (dms.)	lb.	— -	.29¾
Leonil SA*	lb.	— -	.55
Lomar PW*	lb.	— -	.18
Marasperse C*	lb.	.06¼ -	.06¾
CB*	lb.	.12¼ -	.13¼
N*	lb.	.09½ -	.10½
Monoethanolamine (dms., dlvd.)	lb.	.25 -	.28
Naccotan A*	lb.	.16½ -	.21
Nekal BA-75*	lb.	— -	.40
BX-78*	lb.	— -	.64
Nopco 1187-X*	lb.	.15 -	.16
Pluronic F68*	lb.	.38½ -	.44
Polyfon*	lb.	.08 -	.09
R & R 551*	lb.	— -	.28
Rubbex*	lb.	.267 -	.285
Stablex B*	lb.	.50 -	.95
Stan-Chem BQC*	lb.	.12¼ -	.17¼
1067*	lb.	— -	.13½
1471*	lb.	.1687 -	.2187
2251*	lb.	.12¼ -	.17¼
Trenamine D-25*	lb.	.32½ -	.36
Triethanolamine (dms., dlvd.)	lb.	.22 -	.25
U-3051*	lb.	— -	.148
Yelkin TT*	lb.	.13 -	.16
TTS*	lb.	.13 -	.16

EXTENDERS

Advagum 1098*	lb.	— -	.64
Arcco 1071-13B*	lb.	.14½ -	.15½
1073-18B*	lb.	.13½ -	.14½
1294-36B*	lb.	.11½ -	.12½
Car-Bel-Ex-A* (and B*)	lb.	— -	.14
Extender 600*	lb.	— -	.1765
Facile Gum 4A*	lb.	.48 -	.50
Millex*	lb.	— -	.07
W*	lb.	— -	.07
Nopco 2271*	lb.	.15½ -	.16½
Polyco 418*	lb.	.17 -	.18
PR-162 Latex Extender*	lb.	— -	.182
Solvitose HDF*	lb.	.22 -	.25
Synprolac*	lb.	.16 -	.23
Synprowax*	lb.	— -	.23
Vistanex*	lb.	— -	.35

FILLERS (Inert and Reinforcing)

Abrasives			
Carbonite*	lb.	.21½ -	1.35
Lionite*	lb.	.16 -	1.27
Pumice	lb.	.03 -	.05
Walnut Shell Grits	lb.	.05 -	.08
Aluminum Hydrate	lb.	.0850 -	.1200
Kaiser Alumina*	lb.	.026 -	.059
Aluminum Silicate			
Aluminum Flake*	ton	23.50 -	30.00
Marter White*	ton	18.50 -	30.00
Barium Carbonate (l.c.l.)	ton	95.50 -	100.00
Barytes			
No. 1 Floated, White*	ton	45.00 -	65.10
No. 2 Floated, Unbleached*	ton	43.00 -	63.10
No. 22 Barytes* (c.l.)	ton	— -	25.00
No. 3805 Barytes*	ton	22.00 -	26.75
Foam A*	ton	— -	45.00
Sparmite*	ton	80.00 -	85.00
XIOR*	ton	75.00 -	80.00
Bentonite (c.l.)	ton	— -	13.50
Argosite Clay* (c.l.)	ton	— -	12.50
Bennett Clay* (c.l.)	ton	— -	32.50
SPV Volclay* (c.l.)	ton	— -	12.50
White Hi-Gel*	ton	— -	65.90
Blanc Fixe	ton	72.50 -	120.00
Calcium Carbonate			
Atomite* (c.l.)	ton	— -	32.50
B.I. White No. 1 (c.l.)	ton	— -	9.00
Calcene NC*	ton	72.50 -	92.50
TM*	ton	75.00 -	95.00
Calwhite*	ton	— -	20.00
Camel-Carb*	ton	— -	12.00
Camel-Tex*	ton	— -	20.00
Camel-Wite*	ton	— -	32.50
Duramite*	ton	— -	36.00
Gamaco* (c.l.)	ton	— -	32.50
Georgia Marble 5-25* (c.l.)	ton	— -	20.00
No. 10 White* (c.l.)	ton	— -	11.00
Kalite*	ton	50.00 -	65.00
Keystone White*	ton	— -	18.00
Laminar*	ton	— -	30.00
Lesamite* (c.l.)	ton	— -	27.50
Lorite*	ton	30.00 -	35.00
Millical*	ton	38.00 -	53.00
Multifex MM*	ton	110.00 -	125.00
Non-Fer-Al*	ton	32.50 -	37.50
Purecal M*	ton	56.75 -	80.75
SC*	ton	110.00 -	125.00
T*	ton	110.00 -	125.00
U*	ton	120.00 -	135.00

FILLERS (Cont'd)

Calcium Carbonate (cont'd)			
Rambo No. 1*	ton	— -	10.50
Snowflake*	ton	17.00 -	20.00
Super Multifex*	ton	160.00 -	175.00
Surfex*	ton	37.50 -	52.50
Suspenso*	ton	35.50 -	50.50
Witcarb Reg.*	ton	56.75 -	85.00
P*	ton	110.00 -	140.00
R*	ton	120.00 -	150.00
RC*	ton	110.00 -	140.00
York White*	ton	— -	9.50
Calcium Silicate			
Silene EF*	ton	120.00 -	140.00
Calcium Sulfate, Anhydrous			
Snow White Filler*	ton	— -	20.50
Calcium Sulfate Hydrous			
Terra Alba No. 1*	ton	— -	16.00
Chalk Whiting (l.c.l.)	lb.	.01½ -	.01¾
Recco Paris Whiting*	ton	— -	33.00
OMYA Whiting*	ton	— -	30.00
Clay			
Afton Clay*	ton	11.00 -	30.00
Aiken Clay*	ton	— -	13.00
Alsilite* (c.l.)	ton	30.00 -	45.00
Alsite* (c.l.)	ton	— -	14.00
Aluminum Flake*	ton	23.50 -	30.00
Buca* (c.l.)	ton	— -	45.00
Burgess No. 20*	ton	— -	35.00
No. 30*	ton	— -	37.00
Burgess Iceberg*	ton	— -	50.00
Catalpo* (c.l.)	ton	— -	35.00
Champion*	ton	— -	14.00
C.S.D.* (c.l.)	ton	— -	13.50
Crown*	ton	— -	14.00
Dixie* (c.l.)	ton	— -	14.00
Franklin Clay—R* (c.l.)	ton	13.50 -	30.00
G. K. Soft*	ton	11.00 -	28.00
Harwick Clays*	ton	14.50 -	57.00
Hi-White R*	ton	— -	13.50
Kalloid Clay* (c.l.)	ton	— -	10.50
LGB*	ton	— -	17.00
LGP*	ton	— -	19.00
McNamee* (c.l.)	ton	— -	13.50
Natka 1200 (c.l.)	ton	— -	12.00
Par* (c.l.)	ton	— -	11.00
Paragon*	ton	— -	13.50
Pigment 5*	ton	23.50 -	26.50
33*	ton	— -	37.00
Recco* (c.l.)	ton	— -	14.00
Swanee Clay*	ton	— -	12.50
Snobrite*	ton	— -	12.50
Suprex*	ton	— -	14.00
Whitetex* (c.l.)	ton	— -	50.00
Windsor Clay* (c.l.)	ton	13.00 -	30.00
4200 Clay*	ton	— -	11.00
Diatomaceous Earth	ton	30.00 -	50.00
Kaylorite* (c.l.)	ton	— -	30.00
Lorite*	ton	— -	30.00
Flock			
Cotton (White)	lb.	.28 -	.32
Colored	lb.	.11 -	.19
Filfloc F 40-9000*	lb.	— -	.13
F 6000*	lb.	— -	.36
Polycel*	ton	110.00 -	210.00
Rayon, Bleached or Dyed	lb.	.75 -	1.20
Rayon, Grey	lb.	— -	.18
Rayon, Pink	lb.	— -	.20
Solka-Floc* (l.c.l.)	lb.	.07 -	.16
Glue, Amber	lb.	.17 -	.19
Ground Softwood Bark			
Silvacon* (c.l.)	ton	55.00 -	100.00
Leather			
Flour (dust)	lb.	.12 -	.15
Shredded	lb.	.05 -	.17
Lignin	lb.	.06 -	.08
Indulin*	lb.	.06 -	.08
Limestone, Pulverized	ton	3.00 -	5.00
Asbestol Regular*	ton	27.00 -	29.00
Asbestol Superfine*	ton	32.00 -	34.00
Georgia Marble No. 10*	ton	— -	11.00
Industrial Filler No. 100*	ton	— -	5.75
Micro Velva A*	ton	49.00 -	51.00
L*	ton	57.00 -	59.00
No. 1 White*	ton	— -	10.00
Magnesium Carbonate	lb.	.10½ -	.14¼
K & M Clearcarb*	lb.	— -	.14
Technical* (c.l., eqld.)	lb.	.10½ -	.12
Magnesium Silicate (see Talc)			
Mica	lb.	.01¼ -	.07¾
Concord*	lb.	.07½ -	.08¼
Micro-Mica*	lb.	.07½ -	.08¼
Mineralite* (c.l.)	ton	40.00 -	85.00
Silversheen*	lb.	.08 -	.08¼
Triple A Mica* (c.l.)	ton	— -	25.00
Vermiculite*	lb.	— -	.11
Wet Ground Biotite Mica	lb.	.06 -	.06¾
Wet Ground Mica No. 160*	lb.	.07½ -	.08¼
Pecan Shell Flour			
Stan Shell*	ton	45.00 -	75.00
Pyrophyllite			
No. 261*	ton	— -	11.50
Pyrax A* (c.l.)	ton	— -	13.50
WA* (c.l.)	ton	— -	16.00
Sawdust, Graded	ton	14.00 -	35.00
Silica	ton	16.00 -	27.00
DC Silica (pelleted)	lb.	1.45 -	1.65
Extra Fine (bags) (c.l.)	ton	— -	43.00
Slate, Powdered (l.c.l.)	ton	15.00 -	20.00
Lo-Micron Slate Flour*	lb.	— -	.04½
No. 133 Slate Flour*	ton	— -	4.55
Sodium Silico Aluminate			
Zeolex 23*	ton	120.00 -	140.00

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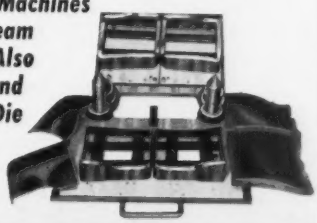

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Talc (Magnesium Silicate)			
Asbestol Regular*	ton	——	- 25.00
Eastern RC-500*	ton	——	- 30.00
No. 41*	ton	——	- 17.70
No. 549*	ton	——	- 63.00
French*	ton	——	- 59.00
L.S. Silver*	ton	32.75	- 37.75
No. 367*	ton	——	- 13.00
No. 1600*	ton	——	- 70.60
No. 1768*	ton	——	- 13.00
Nytal 200* (c.l.)	ton	——	- 27.00
300* (c.l.)	ton	——	- 37.00
Sierra White*	ton	19.75	- 30.75
Soapstone*	ton	——	- 13.00
Walnut Shell Flour	ton	55.00	-100.00
Stan-Shell*	ton	40.00	- 80.00
Whiting, Commercial	ton	——	- 7.50
Allied Whiting*	ton	10.50	- 21.50
Camel-Carb*	ton	——	- 10.00
Calwhite (c.l.)	ton	——	- 20.00
C-C-O White*	ton	——	- 19.00
Georgia Marble No. 15*	ton	——	- 20.00
No. 16*	ton	——	- 20.00
Keystone* (c.l.)	ton	18.00	- 20.00
Piqua No. 1 YAA* (c.l.)	ton	——	- 9.00
No. 2 LS* (c.l.)	ton	——	- 9.00
Snowflake* (c.l.)	ton	——	- 20.00
Stan-White 325*	ton	10.50	- 13.10
Veroc* (c.l.)	ton	——	- 10.50
Welco* (c.l.)	ton	——	- 10.50
York White R* (c.l.)	ton	——	- 9.00
Wood Flour	ton	31.50	- 48.00

FINISHING MATERIALS, SURFACE

Beaco Finishes*	gal.	2.10	- 2.35
Black Out*	gal.	4.50	- 8.00
Shellac, Orange Gum	lb.	.50	- .60
VanWax*	gal.	1.45	- 1.50

FLAME RETARDANTS

Celluflex CEF* (dms.)	lb.	——	- .65
Chlorowax 50*	lb.	.16¾	- .17¾
70*	lb.	.18½	- .20
Halowax*	lb.	.35½	- .61½
Zinc Borate 3167*	lb.	.1920	- .2020
Zyrox Compounds*	lb.	.38	- .95½

LATEX MODIFIERS

Ludox	lb.	.15	- .16¾
OPD-101*	lb.	——	- .26
202*	lb.	——	- .29
Ubatol U-2001* (dms.)	gal.	1.58	- 1.67

LUBRICANTS, MOLD

Akro Gel*	lb.	——	- .165
Alipal CO-433*	lb.	——	- .20
CO-436*	lb.	——	- .24
Aluminum Stearate Crown Brand*	lb.	.37	- .42
Amine, Mixed Crude*	lb.	.21	- .25
Amine Residue*	lb.	.07½	- .09½
Aquadag*	lb.	3.50	- 4.00
Aquarex D*	lb.	——	- .78
L*	lb.	——	- .94
ME*	lb.	——	- .80
MDL*	lb.	——	- .33
WAQ*	lb.	——	- .22
Armeen HT*	lb.	.36	- .40
180*	lb.	.52	- .56
Armid HT (flaked)*	lb.	.32	- .36
0*	lb.	.39	- .41
Borax, Granular (l.c.l.)	ton	89.00	- 94.00
Carbowax 4000*	lb.	.31	- .32
CD Mold Release B*	gal.	5.00	- ——
B-2*	gal.	5.00	- ——
Colite Concentrate* (dms.)	gal.	.90	- 1.15
Colite D43D*	gal.	1.15	- 1.40
Concentrex*	lb.	——	- .25
Dag Dispersions No. 197*	lb.	1.85	- 2.90
D.C. 7 Compound*	lb.	5.13	- 6.50
D.C. Emulsion No. 7*	lb.	1.59	- 2.07
No. 8*	lb.	1.26	- 1.80
No. 35*	lb.	1.26	- 2.50
No. 35A*	lb.	1.26	- 2.50
No. 35B*	lb.	1.26	- 2.50
No. 36*	lb.	1.26	- 2.50
D.C. Mold Release Fluid*	lb.	3.14	- 4.75
Dri-Lube*	lb.	——	- .22
Emulsion Lubricant A80*	lb.	——	- 1.80
45*	lb.	——	- 1.80
G-E Silicone Emulsion SM-55*	lb.	1.26	- 1.80
SM-61*	lb.	1.36	- 1.55
SM-62*	lb.	1.26	- 1.80
G-E Silicone Fluid SF-92*	lb.	3.39	- 5.00
SF-96*	lb.	3.14	- 4.25
Glydag G*	lb.	1.30	- 2.45
Hawkeye Flake* (dlvd.)	lb.	.15	- .15¾
HSC No. 35*	lb.	1.22	- 2.46
No. 515	lb.	1.22	- 2.46
Igepal CO-430*	lb.	——	- .29
CO-630*	lb.	——	- .29
CO-530*	lb.	——	- .29
Igepon AP-78*	lb.	——	- .48
T-51*	lb.	——	- .13½

LUBRICANTS, MOLD (Cont'd)

Kokobace R*	lb.	.17½	- .18½
Lubrex	lb.	.25	- .30
Lubri-Flo*	gal.	10.00	- 12.00
Migralube*	lb.	——	- .35
ML-1027-2C*	gal.	——	- 2.15
ML-1028-2C*	gal.	——	- 2.15
Mold Lubricant No. 72 Conc.* (dms.)	gal.	——	- 1.90
No. 735* (dms.)	gal.	——	- 1.25
No. 759* (dms.)	gal.	——	- 1.20
No. 825* (dms.)	gal.	——	- 1.90
No. 856* (dms.)	gal.	——	- 1.90
No. 880* (dms.)	gal.	——	- 1.12
No. 887* (dms.)	gal.	——	- 1.75
No. 896* (dms.)	gal.	——	- 1.26
No. 935* (dms.)	gal.	——	- 1.60
No. 956* (dms.)	gal.	——	- 2.50
No. 965* (dms.)	gal.	——	- 2.05
No. 967* (dms.)	gal.	——	- 2.40
No. 969* (dms.)	gal.	——	- 1.55
No. 975* (dms.)	gal.	——	- 2.90
No. 980* (dms.)	gal.	——	- 1.55
No. 987* (dms.)	gal.	——	- 2.90
Moldeze No. 3*	gal.	5.00	- 6.00
Mold-Brite*	gal.	——	- 1.50
Monopole Oil MD*	lb.	——	- .16
Olate Flakes*	lb.	.22¾	- .23¾
Orvus WA Paste* (dms.)	lb.	——	- .22
Plaskon Polyethylene S*	lb.	.32	- .47
Polyglycol 15-200*	lb.	.25	- .28¾
E4000*	lb.	.31	- .37
Prodag*	lb.	.28	- .42
Purity Flake* (dlvd.)	lb.	.18	- .19¾
Rubber-Flo*	gal.	1.25	- 2.00
Rubber-Glo*	gal.	——	- .94
Rusco Mold Paste*	lb.	——	- .25
Sericite* (l.c.l.)	ton	65.00	- 75.00
Silicone Oil A145*	lb.	3.18	- 3.61
A65*	lb.	2.50	- 2.75
Soybean Lecithin	lb.	.13	- .17
Thermalube*	lb.	——	- .13¾
UC Silicone L-45*	lb.	3.14	- 4.75
LE-45*	lb.	1.26	- 2.50
Ucon Lubricants*	lb.	.26¾	- .27¾
Ulco Mold Soap*	lb.	.15	- .29

LUBRICANTS, RUBBER

Diglycol Stearate Neutral (and SE) (dms.)	lb.	——	- .25
Extrud-o-Lube*	gal.	——	- 1.54
G.B. Naphthenic Neutrals*	gal.	.11	- .18
Ivory Chips*	lb.	.18¾	- .19¾
Latex-Lube GR* (dlvd.)	lb.	.19¼	- .20
No. 82-A* (450 lb. dms.)	lb.	——	- .08½
Propylene Stearate (dms.)	lb.	.35	- .60

LUBRICANTS, RUBBER SURFACE

Barium Stearate	lb.	.39	- .44
Calcium Stearate	lb.	.37	- .42
Crown Brand*	lb.	.37	- .42
D.C. 4 Compound*	lb.	5.13	- 6.50
D.C. 200 Fluid*	lb.	3.14	- 4.75
ELA*	lb.	——	- .82
G-E Silicone Fluid SF-92*	lb.	3.39	- 5.00
Glycerized Lubricant*	gal.	——	- 1.48
Glydag B*	lb.	1.50	- 2.10
G*	lb.	1.30	- 2.45
HSC No. 35*	lb.	1.28	- 1.34
No. 515*	lb.	1.28	- 1.34
Hydro-Zinc*	lb.	——	- .20
Latex-Lube Pigmented* (dlvd.)	lb.	.17¼	- .18¼
R-66*	lb.	——	- .16½
Liqui-Lube* (dlvd.)	lb.	——	- .16¼
N.F.* (dlvd.)	lb.	——	- .16¾
N.T.* (dlvd.)	lb.	——	- .16¾
Lubrex*	lb.	.25	- .30
Magnesium Stearate Crown Brand*	lb.	.40	- .45
Polyethylene Glycol	lb.	.22	- .26
Rubber Free (Concentrate)*	gal.	——	- 1.44
Jel*	lb.	.18	- .21½
Slab-Dip*	lb.	.16	- .18½
Soybean Lecithin	lb.	.13	- .17
Stock-Lube*	lb.	——	- .19
UC Silicone L-45*	lb.	3.14	- 4.75
Zinc Stearate	lb.	.39	- .44

MOLD CLEANERS

Actusol* (dlvd.)	gal.	1.45	- 1.65
Alkon* (dlvd.)	lb.	.16	- .16½
CA-301*	gal.	——	- 2.49
CA-302*	gal.	——	- 2.63
G-O 6910*	lb.	.38	- .40
Metso Anhydrous*	cwt.	5.35	- 7.60
Metso 99*	cwt.	4.80	- 7.05
200*	cwt.	6.30	- 8.55
Granular*	cwt.	4.10	- 6.35
Orvus Extra Granules*	lb.	.22½	- .23½
Rubber-Sol*	gal.	2.97	- 3.97
Sprex A.C.* (dlvd.)	lb.	.17¾	- .18¾
Zip Mold Cleaner*	gal.	.95	- 1.45

PEPTIZING AGENTS

Peptizer P-12*	lb.	.95	- 1.25
Pepton 22 Plasticizer*	lb.	.79	- .82
RPA 2*	lb.	——	- .78
3*	lb.	——	- .47
3 Conc.*	lb.	——	- .83
5*	lb.	——	- .59
6*	lb.	——	- 1.58

PLASTICIZERS & SOFTENERS

Acto 500*	lb.	——	- .09
Adipol BCA*	lb.	.47	- .47½
2EH*	lb.	.42½	- .45½
10A*	lb.	.42½	- .45½
ODY*	lb.	.47	- .50
810*	lb.	.42½	- .45½
XX*	lb.	.42½	- .45½
Anhydrol 6990*	lb.	.51	- .56
Arneel*	lb.	.27	- .39
SD*	lb.	.36	- .40
Arolene 1980* (c.l.)	lb.	——	- .10
Aromatic Plasticizer 10* (and 25*) (dms.)	lb.	.05	- .06½
Aromatic Tar	gal.	.0573	- .1973
Bardol*	lb.	.02¼	- .03¾
B*	lb.	.06¼	- .06½
Bayol D*	gal.	——	- .382
F*	gal.	——	- .52
Beeswax, Bleached	lb.	.80	- .83
Yellow Refined	lb.	.75	- .80
Bondogen*	lb.	.55	- .60
B.R.C. No. 20*	lb.	.0150	- .0175
No. 21*	lb.	.02¾	- .03
No. 22*	lb.	.02½	- .02¾
B.R.H. 2*	lb.	.0213	- .0351
BRS 700*	lb.	.0200	- .0285
B.R.T. 3*	lb.	.0180	- .0265
4*	lb.	.0250	- .0260
7*	lb.	.0300	- .0310
B.R.V.*	lb.	.0475	- .0565
Bunarex Resins*	lb.	.07	- .08
Bunatak AH*	lb.	——	- .09½
N*	lb.	——	- .31
U*	lb.	——	- .17½
No. 90*	lb.	——	- .09
No. 210*	lb.	——	- .14
Butac*	lb.	.12½	- .13½
BxDC (dms.)	lb.	.40	- .41
Butyl Carbitol Periargonate (dms.)	lb.	——	- .64½
Butyl Cellosolve Perlargonate (dms.)	lb.	——	- .68
Butyl Oleate	lb.	.23¼	- .26
Butyl Palmitate	lb.	——	- .26½
Butyl Stearate (dms.)	lb.	.22¾	- .24¾
BWH-1*	lb.	.16	- .17
Cabflex DDA*	lb.	.42½	- .45½
DDP*	lb.	.30½	- .33½
Di-BA*	lb.	.43¼	- .46¼
Di-OA*	lb.	.42½	- .45½
Di-OP*	lb.	.30½	- .33½
Di-OZ*	lb.	.48	- .51
DOA*	lb.	.42½	- .45½
DOP*	lb.	.30½	- .33½
HS-10	lb.	.44	- .47
ODA*	lb.	.42½	- .45½
ODP*	lb.	.30½	- .33½
TCP*	lb.	.34½	- .37½
Califlux 510* (and 550*)	lb.	.02½	- .03¼
G.P.*	lb.	.01¼	- .02
R-100*	lb.	.04½	- .05¼
TT*	lb.	.0170	- .0245
Candelilla Wax, Prime	lb.	——	- .64
Refined Light	lb.	.55	- .58
Carbowax 4000* (dms.)	lb.	.31	- .32
Carnauba Wax, Crude	lb.	.60	- .62
Flaked	lb.	.75	- 1.20
Refined, Technical	lb.	.65	- .68
Refined, Pure	lb.	.75	- .80
Yellow	lb.	——	- 1.35
Celluflex* (dms.) 112* (t.c., dlvd.)	lb.	——	- .34½
179-A* (t.c., dlvd.)	lb.	——	- .34½
179-C* (t.c., dlvd.)	lb.	——	- .34½
179-EG* (t.c., dlvd.)	lb.	——	- .34½
DBP* (t.c., dlvd.)	lb.	——	- .30
DOP* (t.c., dlvd.)	lb.	——	- .30½
TPP* (dms., eqld.)	lb.	——	- .40
Ceresin Wax	lb.	.11½	- .28
Chlorowax 40*	lb.	.15¼	- .17¼
50*	lb.	.16¾	- .17¾
70*	lb.	.18½	- .20
LV*	lb.	.17¼	- .19¼
CTLA Polymer*	gal.	.20	- .36
Cumar Resins*	lb.	.07	- .19
Darex DBP*	lb.	.30	- .33
DOP*	lb.	.30½	- .33½
DIOP*	lb.	.30½	- .33½
D.B.M.*	lb.	.32	- .34¼
Decylbutyl Phthalate	lb.	.27	- .30
Degras, Common	lb.	——	- .14
Diallyl Phthalate	lb.	.49¾	- .52¼
Dibenzyl Sebacate	lb.	.88	- .89½
Dibutoxyethyl Sebacate	lb.	——	- .56¼
Dibutyl Phthalate	lb.	.30	- .33
Dibutyl Sebacate	lb.	.64½	- .67
Dicapryl Adipate	lb.	.42	- .44
Dicapryl Phthalate	lb.	.29½	- .31½
Dicapryl Sebacate	lb.	.58	- .59½
Di-Carbitol Phthalate (dms.)	lb.	.42	- .42½
Dicyclohexyl Phthalate	lb.	.58¼	- .59¼
Diethyl Phthalate (t.c.)	lb.	.25	- .27¾
Di-2-ethylhexyl Phthalate	lb.	——	- .30½
Dihexyl Adipate	lb.	.42	- .44
Dihexyl Phthalate	lb.	.30	- .32

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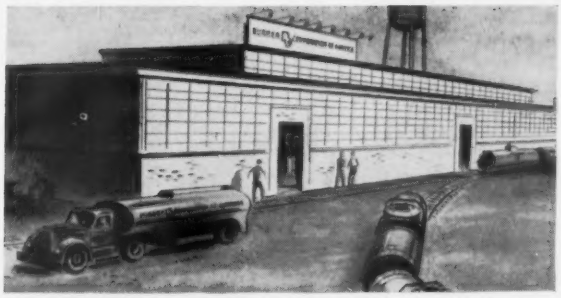

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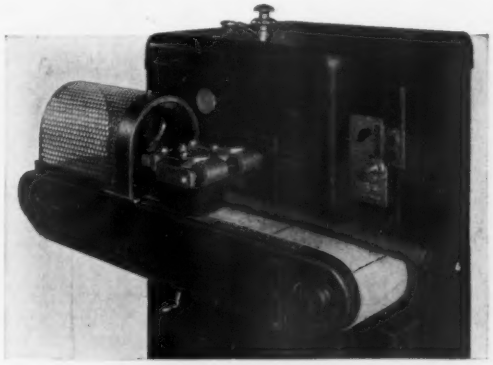

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PLASTICIZERS & SOFTENERS (Cont'd)

Dihexyl Sebacate	lb.	.62	.63½
Diisobutyl Azelate	lb.	—	.47¾
Di-iso-octyl Adipate	lb.	.42½	.45½
Di-iso-octyl Phthalate (t.c.)	lb.	.30½	.33½
Dimethyl Phthalate (t.c.)	lb.	.27½	.30¼
Dimethyl Sebacate	lb.	1.25	1.20½
Dinonyl Adipate	lb.	.44½	.47½
Dinopol 235*	lb.	.35½	.38½
IDO*	lb.	.30½	.33½
MOP*	lb.	.32½	.35½
Dioctyl Adipate	lb.	.42½	.45½
Dioctyl Phthalate (dms.)	lb.	.30½	.33½
Dioctyl Sebacate (dms.)	lb.	.58½	.61
D.I.O.P. (dms.)	lb.	.30½	.33½
Dipolymer Oil	gal.	.33	.48
Dispersing Oil No. 10*	lb.	.06	.06¼
Dutrex 6*	gal.	—	.11
15E*	gal.	—	.10
Elastex 10-P*	lb.	.30½	.33½
50-B*	lb.	.25	.28
DCHP*	lb.	.59	.60
Emulphor EL-719*	lb.	—	.58
Epoxy Plasticizer	lb.	.33½	.36
Drapex 3.2*	lb.	.40	.45
Drapex 4.4*	lb.	.37	.42
Esparto Wax	lb.	—	.55
Estac*	lb.	—	.16
Facile Gum 4A*	lb.	.48	.50
Flexol B-400*	lb.	.27	.28
DOP*	lb.	.32½	.33½
TOF*	lb.	.45½	.46½
3GH*	lb.	.45½	.46
3GO*	lb.	.54½	.55
4GO*	lb.	.34½	.35½
426*	lb.	.29	.30
Flexricin P-1*	lb.	—	.32
P-4*	lb.	—	.31
P-6*	lb.	—	.37
P-8*	lb.	—	.33
Fortex* (dms.)	lb.	.12½	.14½
Galex W-100*	lb.	.15½	.19¼
G.B. Asphaltic Flux*	gal.	.10	.18
G.B. Light Process Oil*	lb.	.02½	.03¼
Medium Process Oil*	lb.	.03½	.04¼
G.B. Naphthenic Neutrals*	gal.	.11	.18
Good-rite GP233*	lb.	.44¼	.47¾
GP235*	lb.	.42½	.45½
GP236*	lb.	.42½	.45½
GP261*	lb.	.34	.37
GP265*	lb.	.30½	.33½
GP266*	lb.	.30½	.33½
Harflex 500*/ (dms.)	lb.	.31½	.33½
Herron-H.T.*	gal.	.16	.27
Herron-Plas*	lb.	—	.03¾
Herron-Wax*	lb.	.05¼	.06
No. 23*	lb.	.08¼	.08¾
No. 24*	lb.	.07¼	.07¾
HSC No. 13*	lb.	.20	.27
No. 28 and 38*	lb.	.20	.27
Indonex 632½* (633½*, 634½*, 637½*)	gal.	.11	.17
Isooctyl Decyl Phthalate	lb.	.30½	.33½
Kapsol*	lb.	.32¼	.35¼
Kenflex*	lb.	.18	.27
Kesscoflex 101* (dms.)	lb.	—	.37½
103* (dms.)	lb.	—	.38
MCO* (dms.)	lb.	—	.35½
BCL* (dms.)	lb.	—	.37½
MCP* (dms.)	lb.	—	.41
BCP* (dms.)	lb.	—	.36
KP 23*	lb.	.29	.32
90*	lb.	.40	.43
140*	lb.	.46	.48½
201*	lb.	.58¼	.59¼
220*	lb.	.31	.34
555*	lb.	.45	.47½
Kremol 40*	gal.	.36	.46
50*	gal.	.39	.49
Kronisol* (dms.)	lb.	.33	.36
Kronitex AA* (dms.)	lb.	.34½	.37½
I* (dms.)	lb.	.34½	.37½
K-3*	lb.	.34½	.37½
MX*	lb.	.34½	.37½
Lanolin, Tech. Anhydrous	lb.	—	.26
Latex-Lube G.R.*	lb.	.19¼	.20
Lead Oleate	lb.	—	.30½
Lindol* (dms., t.c.)	lb.	.34½	.37½
Locusol No. 1-6980*	lb.	.30	.34
2-Mercaptoethanol (dms.)	lb.	1.25	1.50
Methox*	lb.	.38½	.41
Methyl Laurate	lb.	.25	.27
Methyl Oleate	lb.	—	.20
Methyl Stearate (dms.)	lb.	—	.30
Monoplex S-71*	lb.	.46½	.47½
Montan Wax, Crude	lb.	.21	.27
Flaked	lb.	.27	.29
Morflex*	lb.	.32	.69½
MR 2088* (dms.)	lb.	—	.19
Natac*	lb.	.12	.13
Nebony Resins* (dms.)	lb.	.04½	.07¼
Neolene 210* (t.c.)	lb.	—	.16
212* (t.c.)	lb.	—	.14
220* (t.c.)	lb.	—	.15
Nerium*	lb.	—	.09
Nevillac Resins* (dms.)	lb.	.31	.85
Neville LX-880* (dms.)	lb.	.12	.13½
LX-685* (dms.)	lb.	.12½	.17½
Neville Resins* (dms.)	lb.	.07¼	.20
Nevindene Resins* (dms.)	lb.	.16½	.20
Nevinol* (dms.)	lb.	—	.24
Nuba 1* (and 2*) (dms.)	lb.	.06¼	.06¾
3X* (dms.)	lb.	.07¾	.08¼
No. 480 Oil Proof Resin*	lb.	—	.18
Ohopex Q10* (dms.)	lb.	.29½	.32½
R9* (dms.)	lb.	.35½	.37¾

PLASTICIZERS & SOFTENERS (Cont'd)

Ortho-Nitrobiphenyl	lb.	.13	.15
Ozokerite Wax, White and Yellow	lb.	.24	.31
Paradene Resins (dms.)	lb.	.07¼	.08
Para Flux* (dms.)	gal.	.19¼	.20¼
2016* (dms.)	gal.	.22	.23
Para Lube* (l.c.l.)	lb.	.046	.048
Paraplex G-40*	lb.	.50	.51
G-50*	lb.	.40¾	.41¾
G-53*	lb.	.45	.46
G-60*	lb.	.35	.36
G-62*	lb.	.37½	.38½
Parmo*	lb.	.06	.13½
Pepton 22 Plasticizer*	lb.	.79	.82
PG-16*	lb.	—	.35
Philrich-5* (t.c.)	gal.	—	.11
Picco 10* (and 25*)	lb.	.15	.17
60* (and 75*)	lb.	.15	.17
100*	lb.	.15	.17
Piccocizer 30*	lb.	.05½	.07
Piccolastic A* (B*, C*, D* & E*)	lb.	.28	.29
FT* (FHF* & FX*)	lb.	.1815	.1965
T-135*	lb.	.22¾	.23¼
Piccolyte S Resins*	lb.	.20½	.22¾
Piccopale Resins*	lb.	.12	.13
Piccoumaron Resins*	lb.	.07	.24½
Pigmentar*	lb.	.0460	.0745
Pigmentaroil*	lb.	.0460	.0745
Plastac M*	lb.	—	.09¼
Plasticizer 2286*	lb.	—	.26¼
Plasticizer 4141*	lb.	.56¾	.66¾
Plasticizer DP-200, DP-250, DP-520*	lb.	.42¼	.46¼
Plasticizer MT-511*	lb.	—	.68¾
Plasticizer ODN*	lb.	.34	.40
Plasticizer SC*	lb.	.50	.51
Plasticizer W-13*	lb.	.37	.38¼
Plastoflex 3*	lb.	—	.52
50*	lb.	.34¼	.35¼
55*	lb.	.31	.32
520*	lb.	.37½	.38½
SP-2*	lb.	—	.43
VS*	lb.	.41¾	.42¾
Plastogen*	lb.	.07¾	.08
Plastolein 9050* (c.l.)	lb.	.54	.56
9055*	lb.	.30	.32
9058*	lb.	.50	.52
9250*	lb.	.37¾	.39¼
9715*	lb.	.42½	.45½
Plastone*	lb.	.23	.27
Polycizer 162*	lb.	.30½	.33½
332*	lb.	.40	.43
562 and 662*	lb.	.30½	.33½
532 and 632*	lb.	.40	.43
ED*	lb.	—	.51
Polyco 438*	lb.	.34	.35
Polymel C-130*	lb.	.19½	.20½
D*	lb.	.23½	.24½
6*	lb.	.05¾	.07¾
Process Oil C-255* (c.l.)	gal.	—	.22
Propylene Stearate (dms.)	lb.	—	.32
PRR 1*	gal.	.15	.35
PT 67 Light Pine Oil* (dms.)	gal.	—	.60
101 Pine Tar Oil* (t.c., dms.)	gal.	.0460	.0634
400 Pine Tar* (600* & 800*) (t.c., dms.)	lb.	.0460	.0634
PX-104*	lb.	.32	.33
PX-108*	lb.	.32½	.33½
PX-138*	lb.	.32½	.33½
PX-208*	lb.	.44½	.45½
PX-238*	lb.	.44½	.45½
PX-404*	lb.	.66	.67
PX-438*	lb.	.60	.61
PX-800*	lb.	.34	.35
PX-917*	lb.	.36½	.37½
Reogen*	lb.	.13¼	.13½
465 Resin* (dms.)	lb.	.07½	.08
Resin C*	lb.	.0225	.0310
Resinex*	lb.	.03¼	.04¾
L-4*	lb.	.02¼	.03¼
Rexflex*	lb.	—	.15
Rosin Oil	gal.	.80	1.35
RR-10 (Neoprene)*	lb.	—	.36
R.S.O. Softening Oil*	lb.	.03	.05
RuBars*	lb.	.19¼	.20
Rubberol*	lb.	—	.25¾
Santicizer B-16*	lb.	.48¾	.49¾
E-15*	lb.	.52¾	.53¾
M-17*	lb.	.44¾	.45¾
No. 140*	lb.	.36½	.37½
No. 141*	lb.	.36	.37
No. 160*	lb.	.28½	.29½
No. 602*	lb.	—	.30½
No. 603*	lb.	—	.27
Sherolatum*	lb.	.03½	.06
Staflex DBES*	lb.	.58	.60½
DOS*	lb.	.58	.60½
IXA*	lb.	.32	.35
KA*	lb.	.36	.38¾
Stan Chlor Oils*	lb.	.13½	.20½
70*	lb.	.17½	.30
Stanolind Petrolatum*	lb.	.07	.156
Wax*	lb.	.31	.33
Sunny South Burgundy Pitch*	lb.	.1030	.1085
Pine Tar*	lb.	.0460	.0801
Pine Tar Oil*	lb.	.0460	.0745
Rosin Oil*	gal.	.58	.87½
Superla Wax*	lb.	.30	.397
Syncera Wax*	lb.	.16	.267
Syn Tac* (c.l.)	gal.	—	.33
Synthetic Revertant Oil	lb.	—	.16
Tar, Refined	gal.	.1200	.1760
Terpene A*	gal.	—	.65
TP-90B*	lb.	.59	.69

PLASTICIZERS & SOFTENERS (Cont'd)

TP-95*	lb.	.65	.75
Transphalt Resins*	lb.	.02¼	.04¾
Tributyl Phosphate	lb.	.50	.53
Tricresyl Phosphate	lb.	.34½	.37½
Turgum S*	lb.	.10¾	.11¾
Vanadiset B*	lb.	.036	.07
C*	lb.	.031	.06
MR 80 Mesh*	lb.	.08½	.12½
Vistac No. 1*	gal.	1.00	1.21
P*	lb.	.18	.18½
Vopcolene 50*	lb.	—	.37
Witcizer 100*	lb.	.26	.27
200*	lb.	.26	.27
201*	lb.	.22¾	.25½
300*	lb.	.30	.33
312*	lb.	.30½	.33½
313*	lb.	.30½	.33½
412*	lb.	.42½	.45½
Witresin*	ton	50.00	57.50

PROCESSING AIDS

Castor Oil, Blown (dms.)	lb.	—	.21
Refined (dms.)	lb.	—	.18½
Castorwax*	lb.	—	.24½
Dutrex 7*	lb.	.12	.20
ELA*	lb.	—	.82
Hydrofol Glycerides 200*	lb.	.15½	.19¾
Kenflex N*	lb.	—	.18
Maleic Anhydride	lb.	—	.27
Millrex*	lb.	—	.15
Nadic Anhydride	lb.	—	.27
Polycin*	lb.	—	.24½
Resin No. 510*	lb.	.15	.22
Pulverized*	lb.	.20½	.25
Thiomalic Acid	lb.	—	2.50
Zyrox*	lb.	.50	.79

PROTECTIVE & STABILIZING AGENTS

Acacia*	lb.	.12¾	.21
Alpha Protein	lb.	—	.23
Aroostoocrat*	lb.	—	.07½
Carob Bean Flour	lb.	—	.40
Casein	lb.	.32	.38
Emcol K-8300* (dms.)	lb.	.14	.18
Ethylene Diamine 68%	lb.	.44	.47
Gum Arabic	lb.	—	.23
Karaya Gum	lb.	—	.35
Locust Bean Gum	lb.	—	.31
Prosein*	lb.	—	.06
Stablex B*	lb.	.50	.95
K*	lb.	.27	.35

RECLAIMING AGENTS

Amalgamator Z-4*	lb.	.32	.33
Armeen C*	lb.	.45	.47
Mixed Crude*	lb.	.17	.23
T*	lb.	.29	.31
Burco RA*	lb.	.05½	.08¾
C-6 Oil* (28* & 32*)	gal.	.33	.38
C-10 Oil*	gal.	.25	.30
C-33* (t.c.)	gal.	—	.21½
C-42* (t.c.)	gal.	—	.23
Caustic Soda—Flake 76% (c.l., dms.)	cwt.	—	4.50
Liquid 50% (t.c.)	cwt.	—	2.80
Solid 76% (c.l., dms.)	cwt.	—	4.10
Cresylic Acid (99-100%)	gal.	.80	.94
D-4* (t.c.)	gal.	—	.27
E-5* (t.c.)	gal.	—	.25
Flake Calcium Chloride (77-80%)	ton	—	29.00
G.B. Reclaiming Oil*	gal.	.12	.18
CD-10*	gal.	.10	.16
CD-50-U*	gal.	.18	.24
Gensol No. 6* (t.c.)	gal.	—	.40
Heavy Aromatic Naphtha	gal.	.13¼	.18½
LX-77 Reclaiming Solvent*	gal.	.21	.33
LX-572 Reclaiming Oil*	gal.	.27	.32
LX-777 Reclaiming Oil*	gal.	.23	.33
Neo-Fat D-242*	lb.	.05½	.07¼
42-70*	lb.	.08¼	.10¼
No. 517 H.B. Oil*	gal.	.11½	.16½
535*	gal.	.22	.27
PT 67 Light Pine Oil* (dms.)	gal.	—	.60
PT 101 Pine Tar Oil* (t.c., dms.)	gal.	.0460	.0634
PT 150 Pine Solvents* (dms.)	gal.	—	.44
Q Oil* (t.c.)	gal.	—	.286
Reclaiming Oil 3186-G*	gal.	.25	.36½
Reclaiming Reagent No. 1431*	lb.	.21	.25
R.P.A. No. 3*	lb.	—	.47
RR-10*	lb.	—	.36
Soda Ash (c.l., bags)	cwt.	—	1.75
Solvent 534*	gal.	.20½	.26½
Solvent Oil 21*	gal.	.24	.29
C-42*	gal.	.23	.38
Union Solvent 4060-O*	gal.	—	.184
X-1 Resinous Oil*	lb.	.0210	.0300

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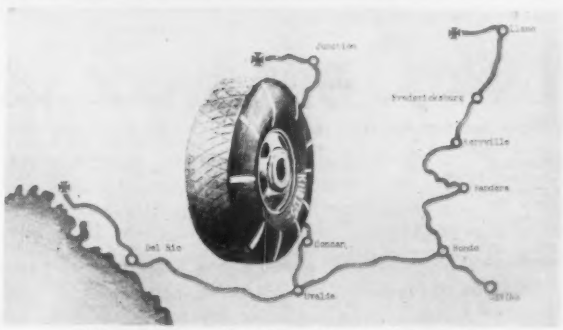

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REINFORCING AGENTS—CARBON BLACK

Channel, Hard Processing (HPC) (bags)

Atlantic HPC-98*	lb.	.0700 -	.1225
Continental F*	lb.	.0700 -	.1225
Croflex*	lb.	.0700 -	.1225
Dixiedensed (and S)*	lb.	.0700 -	.1225
HX HPC*	lb.	.0700 -	.1225
Kosmobile (and S)*	lb.	.0700 -	.1225
Micronex HPC*	lb.	.0700 -	.1225
Witco No. 6*	lb.	.0700 -	.1225

Channel, Medium Processing (MPC) (bags)

Arrow MPC*	lb.	.0700 -	.1100
Atlantic MPC-95*	lb.	.0700 -	.1225
Collocarb*	lb.	.0700 -	.0625
Continental A*	lb.	.0700 -	.1225
Croflex TH*	lb.	.0700 -	.1225
Dixiedensed HM (and S-66)	lb.	.0700 -	.1225
Kosmobile HM (and S-66)	lb.	.0700 -	.1225
Micronex Standard*	lb.	.0700 -	.1225
Spheron 6*	lb.	.0700 -	.1225
Texas M*	lb.	.0700 -	.1225
Witco No. 1*	lb.	.0700 -	.1225

Channel, Easy Processing (EPC) (bags)

Atlantic EPC E-42*	lb.	.0700 -	.1225
Collocarb*	lb.	.0590 -	.0990
Continental AA*	lb.	.0700 -	.1225
Croflex 77*	lb.	.0700 -	.1225
Dixiedensed 77*	lb.	.0700 -	.1225
Kosmobile 77*	lb.	.0700 -	.1225
Micronex W-6*	lb.	.0700 -	.1225
Spheron 9*	lb.	.0700 -	.1225
Texas E*	lb.	.0700 -	.1225
Witco No. 12*	lb.	.0700 -	.1225
Wyex EPC*	lb.	.0700 -	.1100

Channel, Conductive (CC) (bags)

Continental R-40*	lb.	.2400 -	.3200
Dixie 5 Dustless*	lb.	.1200 -	.1900
Dixie Voltex*	lb.	.2400 -	.3200
Kosmink Dustless*	lb.	.1200 -	.1900
Kosmos Voltex*	lb.	.2400 -	.3200
Spheron C*	lb.	.1500 -	.1950
Voltex*	lb.	.2400 -	.3200

Channel, Surface Treated (STC) (bags)

Texas 109*	lb.	.0790 -	.1225

Conductive Furnace Black (CF) (bags)

Aromex CF*	lb.	.0800 -	.1200
Continex CF*	lb.	.1000 -	.1400
Shawinigan Acetylene Black*	lb.	.1700 -	.2600
Vulcan C*	lb.	.1050 -	.1500

Furnace, Fast Extruding (FEF) (bags)

Arovel FEF*	lb.	.0600 -	.1000
Collocarb*	lb.	—— -	.0525
Continex FEF*	lb.	.0600 -	.1000
Croflex 50*	lb.	.0600 -	.1000
Dixie 50*	lb.	.0600 -	.1000
Kosmos 50*	lb.	.0600 -	.1000
Philblack A*	lb.	.0600 -	.1000
Statex M*	lb.	.0600 -	.1000
Sterling SO*	lb.	.0600 -	.1000

Furnace, Fine (FF) (bags)

Statex B*	lb.	.0650 -	.1050
Sterling 99*	lb.	.0650 -	.1050

Furnace, General Purpose (GPF) (bags)

Arogen GPF*	lb.	.0500 -	.0900
Dixie 35*	lb.	.0500 -	.0900
Kosmos 35*	lb.	.0500 -	.0900
Sterling V*	lb.	.0500 -	.0900
V (Non-Staining)	lb.	.0500 -	.0900

Furnace, High Abrasion (HAF) (bags)

Aromex HAF*	lb.	.0700 -	.1100
Continex HAF*	lb.	.0700 -	.1200
Croflex 60*	lb.	.0700 -	.1140
Dixie 60*	lb.	.0700 -	.1140
Kosmos 60*	lb.	.0700 -	.1140
Philblack O*	lb.	.0700 -	.1140
Statex R*	lb.	.0700 -	.1200
Vulcan 3*	lb.	.0700 -	.1140

Furnace, High Modulus (HMF) (bags)

Collocarb*	lb.	.0450 -	.0850
Continex HMF*	lb.	.0525 -	.0950
Croflex 40*	lb.	.0525 -	.0950
Dixie 40*	lb.	.0525 -	.0950
Kosmos 40*	lb.	.0525 -	.0950
Modulex HMF*	lb.	.0525 -	.0925
Statex 93*	lb.	.0525 -	.0950
930*	lb.	.0470 -	.0870
Sterling L*	lb.	.0525 -	.0950
LL*	lb.	.0525 -	.0950

REINFORCING AGENTS—CARBON BLACK (Cont'd)

Furnace, Semi-Reinforcing (SRF) (bags)

Collocarb*	lb.	.0420 -	.0820
Continex SRF*	lb.	.0475 -	.0875
Croflex 20*	lb.	.0475 -	.0875
Dixie 20*	lb.	.0475 -	.0875
Essex SRF*	lb.	.0475 -	.0875
Furnex*	lb.	.0475 -	.0875
Gastex*	lb.	.0525 -	.0925
Kosmos 20*	lb.	.0475 -	.0875
Pelletex*	lb.	.0475 -	.0875
NS*	lb.	.0475 -	.0875
Shawinigan Acetylene Black*	lb.	.1700 -	.2600
Sterling NS*	lb.	.0475 -	.0875
R*	lb.	.0525 -	.0925
S*	lb.	.0475 -	.0875

Furnace Super Abrasion (SAF) (bags)

Philblack E*	lb.	.1250 -	.1650
Vulcan 9*	lb.	.1250 -	.1650

Furnace, Super Abrasion, Intermediate (ISAF) (bags)

Aromex ISAF*	lb.	.0850 -	.1250
Continex ISAF*	lb.	.0850 -	.1350
Dixie 70*	lb.	.0850 -	.1350
Kosmos 70*	lb.	.0850 -	.1350
Philblack I*	lb.	.0850 -	.1300
Statex 125*	lb.	.0850 -	.1350
Vulcan 6*	lb.	.0850 -	.1300

Furnace, Super Conductive (SCF) (bags)

Vulcan SC*	lb.	.1800 -	.2230

Thermal, Fine (FT) (bags)

P-33 (c.l.)*	lb.	—— -	.0575
Sterling FT (c.l.)*	lb.	—— -	.0575

Thermal, Medium (MT) (bags)

Shellblack*(†)	lb.	—— -	.0250
Sterling MT (c.l.)*	lb.	—— -	.0400
MT Non-Staining (c.l.)*	lb.	—— -	.0500
Thermax (c.l.)*	lb.	—— -	.0400
Stainless (c.l.)	lb.	—— -	.0500

REINFORCING AGENTS—SILICA

Cab-O-Sil (compressed)*	lb.	.68 -	.75
Cab-O-Sil (uncompressed)*	lb.	.68 -	.75
D. C. Silica (pelletized)*	lb.	1.45 -	1.65
Hi-Sil 101*	lb.	.10 -	.11½
233*	lb.	.09 -	.10½
X303*	lb.	.40 -	.45
Santocel*	lb.	.62 -	.64

REINFORCING AGENTS—MISCELLANEOUS

Angelo Shellac*	lb.	—— -	.60
Darex Copolymer No. 3*	lb.	.47 -	.49
X34*	lb.	.42 -	.44
43G*	lb.	.39 -	.41
Darex Copolymer Latex No. 3-L	lb.	.41½ -	.46
Durez 12687 (and 12707)*	lb.	—— -	.38
Durez 13355*	lb.	—— -	.29
Good-rite Resin 50*	lb.	.39 -	.41
Hystron*	lb.	.39 -	.41
Kralac A-EP*	lb.	.39 -	.41
Lampblack	lb.	—— -	.12
Marbon S and S-1*	lb.	.39 -	.41
8000*	lb.	.39 -	.41
Marmix*	lb.	.39 -	.41
Pliolite Latex 150*	lb.	.35 -	.39
Pliolite Resin-Rubber Masterbatches*	lb.	.33 -	.57
Pliolite NR*	lb.	.93 -	.95
S6B*	lb.	.39 -	.41
Plio-Tuf G85C*	lb.	.52 -	.54
Polyco 220*	lb.	.18¼ -	.19¼
Polypol S-70*	lb.	.22 -	.23

RETARDERS

Benzoic Acid TBAO-2*	lb.	—— -	.44
Dutch Boy Normasal*	lb.	—— -	.46
ESEN*	lb.	.35 -	.37
Good-rite Vultrol*	lb.	.62 -	.64
Harcopol 1183*	lb.	.70 -	.74
Retarder J*	lb.	.62 -	.64
PD*	lb.	.35 -	.37
W*	lb.	—— -	.45
Retardex*	lb.	.47 -	.50

RUBBER SUBSTITUTES

Mineral Rubber

Black Diamond*	ton	50.00 -	60.00
Byerlyte*	ton	50.00 -	57.00
Hard Hydrocarbon (dms.)*	ton	46.50 -	48.50
Herron Flake*	ton	—— -	45.00
Mineral Rubber, Solid	ton	42.50 -	44.50
M. R. No. 38*	ton	50.00 -	60.00

Vulcanized Vegetable Oils

Amberex*	lb.	.29 -	.36
Brown*	lb.	.1310 -	.2200
Car-Bel-Lite*	lb.	.3000 -	.3300
Neophax*	lb.	.1570 -	.2680
Polyrez A and C*	lb.	.12 -	.17
White*	lb.	.1480 -	.2520

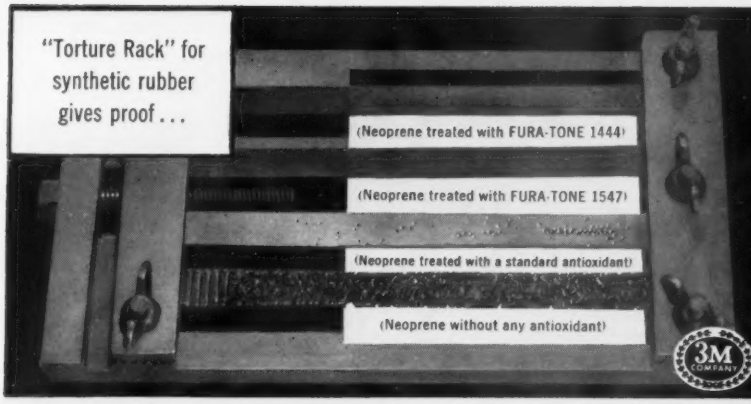
Miscellaneous Rubber Substitutes

G.B. Asphaltenes*	lb.	.06 -	.06½
Gilsowax B*	lb.	.09 -	.11
Resin No. 1098 (dms.)	lb.	—— -	.62
No. 1198*	lb.	.46¼ -	.49¼
Tysonite*	lb.	.24 -	.24¼

SOLVENTS

Acetone (dlvd.)	lb.	.07 -	.10
Amsco Lactol Spirits* (t.c.)	gal.	—— -	.19
Naphthol Spirits*	gal.	—— -	.18
Mineral Spirits*	gal.	—— -	.17
Rubber Solvent* (t.c.)	gal.	—— -	.18
Solv A* (t.c.)	gal.	—— -	.24½
Solv A-80* (t.c.)	gal.	—— -	.30
Solv B* (t.c.)	gal.	—— -	.28½
Solv B-90* (t.c.)	gal.	—— -	.32
Solv D* (t.c.)	gal.	—— -	.30
Solv E*	gal.	—— -	.30
Solv F*	gal.	—— -	.30
Solv F-80*	gal.	—— -	.32½
Solv G*	gal.	—— -	.42½
Special Naphtholite* (t.c.)	gal.	—— -	.18
Special Textile Spirits*	gal.	—— -	.19
Super Hi-Flash Naphtha*	gal.	—— -	.35
Super Naphtholite*	gal.	—— -	.18
Textile Spirits* (t.c.)	gal.	—— -	.19
Amyl Chlorides, Mixed (l.c.l.) (dms.)	lb.	.09¼ -	.10¼
Benzol 90%	gal.	.36 -	.40
Butyl Acetate (t.c.)	lb.	.15 -	.16
Butyl Alcohol (t.c.)	lb.	.15 -	.16
Secondary (dlvd.)	lb.	.14 -	.15
Tertiary (dlvd.)	lb.	.14½ -	.15½
Carbon Bisulfide, Tech.	lb.	.05½ -	.07½
Carbon Tetrachloride	lb.	.09½ -	.12¾
Cosol 1*	gal.	.37 -	.43
2*	gal.	.42 -	.48
Cyclohexane	gal.	.55 -	.72
85% (c.l.) (dms.)	gal.	—— -	.54
Cyclohexanone	lb.	.32 -	.35
Diacetone, Pure (dlvd.)	lb.	.15 -	.16
Dichlorethyl Ether (dms.)	lb.	.14½ -	.15
Formal (dms.)	lb.	.30¾ -	.31¼
Dichloropentane	lb.	.04¼ -	.14¾
Dicon*	gal.	—— -	.50
Halowax Oil*	lb.	.28 -	.41
Heptanes* (t.c.)	gal.	.19 -	.22
Hexanes (t.c.)	gal.	.19 -	.22
Isopropyl Alcohol, Ref. 99% (dlvd.)	gal.	.57 -	.64
Ether, Ref. (dlvd.)	lb.	.07½ -	.08½
Mersol*	gal.	.43 -	.75
Mesityl Oxide (dlvd.)	lb.	.14 -	.15
Methyl Acetone, Syn. (dms., dlvd.)	gal.	.57 -	.63
Methyl Chloride	lb.	—— -	.11½
Methyl Ethyl Ketone	lb.	.14 -	.15
Methyl Isobutyl Ketone (dlvd.)	lb.	.16 -	.17
Methylene Chloride	lb.	.11¼ -	.15
N-5 Pentane Mix* (t.c.)	gal.	—— -	.13½
N-6 Hexanes* (t.c.)	gal.	—— -	.14½
N-7 Hexanes* (t.c.)	gal.	—— -	.13½
Penetrell*	gal.	.40 -	.62
Perchlorethylene	lb.	—— -	.14
Petrolene* (t.c.)	gal.	—— -	.14125
Picolines, Alpha, Refined	lb.	.43½ -	.44
Mixed	lb.	—— -	.35
Proprietary Solvent (dms.)	gal.	.51 -	.72
Propyl Acetate (t.c., dlvd.)	lb.	—— -	.10¼
Alcohol (t.c., dlvd.)	lb.	—— -	.10
PT 150 Pine Solvent* (dms.)	gal.	—— -	.44
Pyridine, Refined	lb.	—— -	.75
Quinoline	lb.	.50 -	1.35
Rubber Solvent (t.c.)	gal.	—— -	.16
Rubsol (t.c.)	gal.	—— -	.12875
Skellysolve B (Hexanes)* (t.c.)	gal.	—— -	.158
C (Heptanes)* (t.c.)	gal.	—— -	.151
R (Rubber Solvent)*	gal.	—— -	1.29
Solvent, Crude, Light	gal.	.19 -	.28
Solvesso 100* (t.c.)	gal.	.33 -	.35
150 (t.c.)	gal.	.33 -	——
Sunny South DD Dipentine*	gal.	.40 -	.62
Sunny South DD Pine Oil*	lb.	.12¼ -	.14¼

"Torture Rack" for synthetic rubber gives proof . . .


(Neoprene treated with FURA-TONE 1444)
(Neoprene treated with FURA-TONE 1547)
(Neoprene treated with a standard antioxidant)
(Neoprene without any antioxidant)

YOU GET GREATER OZONE RESISTANCE WITH FURA-TONE* 1444 and 1547

● Using ozone content over 200 times higher than standard ASTM tests, this neoprene "torture" test proves superior ozone resistance in these relatively inexpensive Irvington antioxidants: FURA-TONE 1444 in Buna-N (used for printing rolls and blankets) and FURA-TONE 1547 in neoprene (and Buna-N) for electric cable coverings. For technical data and samples, contact:

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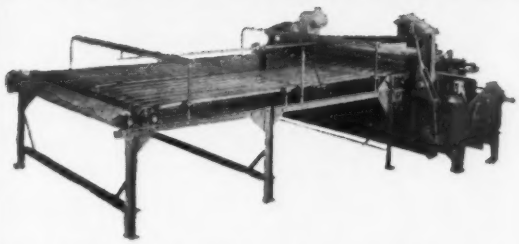

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656

SOLVENTS (Cont'd)

Sunray*	gal.	.1140 -	.1600
Toluene (dms.)	gal.	—— -	.38
Toluol (t.c.)	gal.	.33 -	.35
Trichlorethane	lb.	.13 -	.13½
Triglycol Dichloride	lb.	.63 -	.64
Union Thinner 1* (t.c.)	gal.	—— -	.172
5* (dms.)	gal.	—— -	.197
7* (t.c.)	gal.	—— -	.162
2-50 W Hi-Flash*	gal.	—— -	.41
Xylol	gal.	.34 -	.38

STABILIZING AGENTS (for Vinyl Resins)

Advastab No. 21*	lb.	1.00 -	1.08
50-LT*	lb.	3.20 -	3.35
BC-105*	lb.	.75 -	.80
E-6-B*	lb.	.80 -	.85
L Paste	lb.	.65 -	.70
X23-74*	lb.	.70 -	.80
X30-15*	lb.	.65 -	.75
XBZ-155*	lb.	.69 -	.74
XE-82*	lb.	.85 -	.95
Barca 10*	lb.	.75 -	.80
Barium Ricinoleate (BVS)	lb.	—— -	.70
Barium Stearate	lb.	.39 -	.44
Basic Silicate White Lead	lb.	.20¾ -	.21¾
Cadmium Ricinoleate	lb.	—— -	2.00
Calcium Ricinoleate	lb.	—— -	.55
Dutch Boy DS-207*	lb.	—— -	.54
Plumb-O-Sil A*	lb.	—— -	.29¾
B*	lb.	—— -	.31¼
Tribase*	lb.	—— -	.26½
Dythal*	lb.	—— -	.39½
Ferro 182* (dms.)	lb.	.70 -	.76
200* (dms.)	lb.	1.33 -	1.43
203* (dms.)	lb.	.85 -	.95
541* (dms.)	lb.	.35½ -	.45½
541A* (dms.)	lb.	.81¼ -	.91¾
700* (dms.)	lb.	.48¾ -	.58¾
900* (dms.)	lb.	.90 -	1.00
903* (dms.)	lb.	.55 -	.65
909* (dms.)	lb.	.91 -	1.01
920*	lb.	—— -	.98
931* (dms.)	lb.	.75¾ -	.85¾
993* (dms.)	lb.	.89 -	.99
1203* (dms.)	lb.	1.30 -	1.40
1206* (dms.)	lb.	1.23 -	1.33
1820* (dms.)	lb.	.90 -	1.00
1825* (dms.)	lb.	1.00 -	1.10
Permyl A	lb.	.45 -	.55
Harshaw 1-V-3*	lb.	—— -	.43
1-V-4*	lb.	—— -	.68
1-V-7*	lb.	—— -	.71
2-V-4*	lb.	—— -	.95
2-V-7*	lb.	—— -	1.10
2-V-8*	lb.	—— -	1.30
5-V-1*	lb.	—— -	.41
7-V-1*	lb.	—— -	.90
8-V-1*	lb.	—— -	1.20
8-V-5*	lb.	—— -	.80
8-V-100*	lb.	—— -	.89
9-V-1*	lb.	—— -	.81
12-V-5*	lb.	—— -	.75
24-V-1*	lb.	—— -	1.28
28-V-2*	lb.	—— -	1.18
128-V-5*	lb.	—— -	.86
Lithium Stearate	lb.	.57 -	.62
Fluffy	lb.	.47½ -	.70
Standard	lb.	.52½ -	.75
Metasap 613-A*	lb.	—— -	.69
613-B*	lb.	—— -	.84
613-C*	lb.	—— -	1.06
621*	lb.	—— -	.88
624*	lb.	—— -	.75
633*	lb.	—— -	.75
635*	lb.	—— -	.45
Modicol N*	lb.	.41½ -	.42½
S*	lb.	.30⅜ -	.31⅜
Sodium Silicates 41°/1:32	cwt.	1.00 -	2.10
Stabelan E*	lb.	1.35 -	1.50
XL*	lb.	.55 -	.65
HR-50*	lb.	.75 -	.90
HR Liquid*	lb.	.65 -	.75
HR Paste*	lb.	.85 -	.95
HR Powder*	lb.	.95 -	1.05
No. 110 Liquid	lb.	.65 -	.75
No. 115 Liquid	lb.	.85 -	.95
No. 120 Liquid	lb.	.65 -	.75
Stabilizer No. 3*	lb.	1.90 -	2.00
No. 42*	lb.	.83 -	.93
No. 52*	lb.	1.90 -	2.00
No. 89X*	lb.	.75 -	.80
No. 143*	lb.	.80 -	.90
BC-12*	lb.	.87 -	.95
B-5*	lb.	—— -	.70
CH-14*	lb.	—— -	.65
CH-20*	lb.	—— -	.65
E6B*	lb.	—— -	.95
E-49*	lb.	—— -	.60
E-98*	lb.	—— -	.55
G-1*	lb.	1.25 -	1.40
HR*	lb.	.85 -	.89
JCX*	lb.	—— -	.63
L*	lb.	—— -	.60
M*	lb.	.68 -	.70
OM-10*	lb.	—— -	1.95
OM-18*	lb.	—— -	3.25
PL*	lb.	.63 -	.65
SN*	lb.	—— -	.48
V-1-N*	lb.	—— -	.43
VL-3*	lb.	—— -	1.00
XI*	lb.	.87 -	.90
XV*	lb.	.92 -	.94
XX*	lb.	.58 -	.60
Staflex OY*	lb.	1.00 -	1.20
QXMA*	lb.	—— -	.70

STABILIZING AGENTS (Cont'd)

Stayrite 10*	lb.	.32 -	.37
P-10*	lb.	.39 -	.44
15*	lb.	.53 -	.58
20*	lb.	.37 -	.42
22*	lb.	1.30 -	1.34
25*	lb.	.35 -	.40
70*	lb.	.68 -	.70
71*	lb.	.88 -	.90
75*	lb.	.68 -	.70
76*	lb.	.58 -	.60
80*	lb.	.68 -	.70
90*	lb.	.68 -	.70
95*	lb.	.68 -	.70
229*	lb.	.45 -	.50
Vanstay L*	lb.	.33 -	.35
H.T.*	lb.	.90 -	.92
S*	lb.	.63 -	.65

STIFFENING AGENTS

Neozone*	lb.	—— -	.80
Polyac*	lb.	—— -	1.80
Processing Stiffener 710*	lb.	—— -	.88
Solvitose HDF, H, C-S, T, and E*	lb.	.22 -	.25
Versatil Gum 8-E*	lb.	.15 -	.19

SUN CHECKING AGENTS

Allied AA-1144*	lb.	.23 -	.24
AA-1177*	lb.	.15½ -	.16½
Antisol*	lb.	—— -	.23
Antisun* (Chipped)	lb.	.15½ -	.17½
(Slabbed)	lb.	.15 -	.17
Heliozone*	lb.	.30 -	.31
Microflake*	lb.	.20 -	.24
NBC*	lb.	—— -	1.55
Ross Sunproofing Waxes*	lb.	—— -	.14
Sunolite*	lb.	.16 -	.22
127*	lb.	.16½ -	.20½
154*	lb.	.23 -	.25
Sunproof*	lb.	.31 -	.32
713*	lb.	.25 -	.26
Improved*	lb.	.25 -	.26
Super*	lb.	.40 -	.41
Jr.*	lb.	.20 -	.21
Tonox*	lb.	.52 -	.54

SURFACE ACTIVE AGENTS

Anhydrapent*	lb.	.56 -	.59
Anhydrol 6990*	lb.	.51 -	.56
6991*	lb.	.51 -	.56
Aquarex D*	lb.	—— -	.78
G*	lb.	—— -	.21
MDL*	lb.	—— -	.33
ME*	lb.	—— -	.80
NS*	lb.	—— -	.60
SMO*	lb.	—— -	.50
WAQ*	lb.	—— -	.22
Emulphor EL-620*	lb.	—— -	.40
EL-719*	lb.	—— -	.058
EL-870*	lb.	—— -	.055
Igepal CA-630	lb.	—— -	.29
CO-630	lb.	—— -	.29
CO-730	lb.	—— -	.29
CO-850*	lb.	—— -	.29
CO-880*	lb.	—— -	.29
Igepon CN-42*	lb.	—— -	.25
T-33*	lb.	—— -	.31
T-51*	lb.	—— -	.13½
T-77*	lb.	—— -	.49
Kessco 50201*	lb.	—— -	.43½
50203*	lb.	—— -	.44¼
18201*	lb.	—— -	.38½
18203*	lb.	—— -	.36
Pluronic L62*	lb.	.33½ -	.39
L64*	lb.	.33½ -	.39
Sellogen Gel*	lb.	—— -	.12¾
Soybean Lecithin	lb.	.13 -	.17

TACKIFIERS

Amalgamator Z-4*	lb.	.32 -	.33
Arceo 620-32B*	lb.	.20½ -	.21
716-30*	lb.	.18½ -	.19
1041-21*	lb.	.16½ -	.17
Bunaweld Polymer No. 780*	lb.	—— -	.24
No. 5514*	lb.	—— -	.35
Galex* (dms.)	lb.	.15¼ -	.18
Indopol H-300*	gal.	1.00 -	1.22
Koresin*	lb.	—— -	.95
Liquid Rubber Flux*	lb.	—— -	.14
Nacconal NRSF* (dlvd.)	lb.	.40½ -	.45
Nilox Resin* (c.l.)	cwt.	—— -	14.50
Resin V	lb.	—— -	.23½
Synthol*	lb.	—— -	.24¾
Tackifier 1041-21*	lb.	.16½ -	.17½
Vistac No. 1*	gal.	1.00 -	1.21
A*	lb.	.21½ -	.22¼
Zirex* (c.l.)	cwt.	—— -	14.75

THICKENERS (For Latex)

Alcogum AN-6*	lb.	—— -	.05
AN-10*	lb.	—— -	.08½
PA-10*	lb.	—— -	.12
Betanol* (dms.)	lb.	.70 -	.95
Gomme Labolene*	lb.	.45 -	.47
Good-rite K-702*	lb.	.34½ -	.35
K-704*	lb.	.21 -	.22
K-705*	lb.	.31 -	.32
K-707*	lb.	.18 -	.19
K-708*	lb.	.29 -	.30
K-710*	lb.	.15 -	.16
Modicol VD*	lb.	.13⅜ -	.14⅜
VE*	lb.	.13⅜ -	.14⅜
Polyco 296 BT*	lb.	.15 -	.16
296-N*	lb.	.15 -	.16
530*	lb.	.15 -	.16
Propylene Laurate (dms.)	lb.	.57 -	.82

THICKENERS (For Latex) (Cont'd)

Sodium Silicate, 41°/1:3.2	cwt.	1.00 -	2.10
Solvitose Series*	lb.	.22 -	.25

VULCANIZING AGENTS

Selenium

Vandex*	lb.	—— -	15.50

Sulfur

Aero Brand*	cwt.	—— -	2.40
Blackbird* (c.l.)	cwt.	—— -	2.85
Cloud* (c.l.)	cwt.	—— -	2.80
Crystex*	lb.	.19½ -	.23
Darex Dispersed Sulfur*	lb.	.14 -	.16
Devil A* (c.l.)	cwt.	—— -	2.40
Dispersed Sulfur	lb.	.14 -	.16
Insoluble Sulfur 60*	lb.	.12½ -	.13
Ko-Blend IS*	lb.	—— -	.39
Mist* (Wettable) (c.l.)	cwt.	—— -	4.00
Spider* (c.l.)	cwt.	—— -	2.80
Star* (c.l.)	cwt.	—— -	3.25
Sulfasan R*	lb.	—— -	1.50
Tire* (c.l.)	cwt.	—— -	2.40
Tube* (c.l.)	cwt.	—— -	3.25
Vultac 2*	lb.	.47 -	.49
3*	lb.	.51 -	.53

Tellurium

Telloy*	lb.	—— -	2.50

WETTING AGENTS

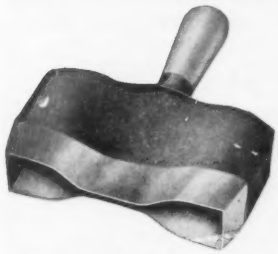
Advawet No. 10*	lb.	—— -	.20
No. 33*	lb.	—— -	.48
Aerosol 18*	lb.	—— -	.40
AY*	lb.	1.00 -	1.20
MA 80%*	lb.	.67 -	.72
OS*	lb.	.39 -	.45
OT 75% Aqueous*	lb.	.63 -	.68
OT 100%*	lb.	1.00 -	1.20
OT-B*	lb.	.85 -	1.05
Alrosal* (dms.)	lb.	—— -	.40
Alrosperse*	lb.	—— -	.18
Anhydrol 6990* and 6991*	lb.	.51 -	.56
Areskap 50*	lb.	.30 -	.38
Dry 100*	lb.	.60 -	.72
Aresket Dry 300*	lb.	.60 -	.72
Aresklene 375*	lb.	.42 -	.57
Armacs*	lb.	.28 -	.77
Arquads*	lb.	.42 -	.61
Emcol 5100* (dms.)	lb.	—— -	.31
Etho-Chemicals*	lb.	.26 -	.58
Ethomeen S/15*	lb.	.48 -	.50
T/15*	lb.	.46 -	.48
Kesco E-122* (dms)	lb.	—— -	.45
18201*	lb.	—— -	.38½
Kreelon 8G* (dms.)	lb.	.26 -	.32
Kyro EO* (dms.)	lb.	—— -	.29¾
Modicol N*	lb.	.41½ -	.42½
S*	lb.	.30⅜ -	.31⅜
Nacconol SL* (dlvd.)	lb.	.084 -	.10
60S* (dlvd.)	lb.	.19 -	.225
Naccosol A* (dlvd.)	lb.	—— -	.52
Orvus AB Granules*	lb.	.15¾ -	.16¾
Parnol*	lb.	.13 -	.18
Santomerse D*	lb.	.44 -	.65
S*	lb.	.13 -	.25
Selapon Gel*	lb.	—— -	.13
Sorapon SF-73*	lb.	—— -	.18
SF-78*	lb.	—— -	.30
Sorbit P*	lb.	—— -	.28
Soybean Lecithin	lb.	.13 -	.17
Stablex G*	lb.	.50 -	.90
Tergitol 4* (dms., dlvd.)	lb.	.32 -	.33
7* (dms., dlvd.)	lb.	.43 -	.44
O8* (dms., dlvd.)	lb.	.31 -	.32
P28* (dms., dlvd.)	lb.	.18½ -	.19
Trenamine W-30	lb.	—— -	.15
Vultamol*	lb.	—— -	.17½
Wetsit Conc.*	lb.	.25 -	.28

MISCELLANEOUS CHEMICALS

Aquesperse 30*	lb.	—— -	.11
Arcopel W-18*	lb.	.17 -	.19
Asbury Graphite*	lb.	.05 -	1.45
Copper Inhibitor X-872-L*	lb.	—— -	2.01
D-Tac*	lb.	—— -	.22
2-Ethyl Hexanol	lb.	.23¾ -	.24¾
Fura-Tone Resin 1226*	lb.	.41 -	.43
HB-20*	lb.	.15 -	.17
HB-40*	lb.	.19 -	.22
MODX*	lb.	.32½ -	.34½
BF*-13	lb.	—— -	.26½
Nacconate 65* (dms.)	lb.	1.20 -	1.23
80* (dms.)	lb.	1.20 -	1.23
100* (dms.)	lb.	1.30 -	1.33
200* (dms.)	lb.	2.00 -	2.03
300* (dms.)	lb.	3.50 -	3.53
Para Resin 2457*	lb.	.04 -	.04½
2702*	lb.	.04 -	.04½
2718*	lb.	.04 -	.04½
Pigmented Filmite* (dlvd.)	lb.	.16¾ -	——
Resorcin, Tech.	lb.	.78½ -	——
Rio Resin*	lb.	.60 -	.62
Rongalite CX*	lb.	—— -	.21½
Sherosope F*	lb.	.15½ -	.17¾
F-455*	lb.	.13½ -	.15¾
L*	lb.	.14 -	.16¼
N*	lb.	.15 -	.17¼
T*	lb.	.16½ -	.18¾
Sublac Resin PX-5*	lb.	.23½ -	.24½
Sulfasan R*	lb.	—— -	1.50
Synpep*	lb.	.54 -	.60
Thiokol LP-2*	lb.	.96 -	1.06
LP-3, LP-32, LP-33*	lb.	.96 -	1.06
LP-8*	lb.	1.25 -	1.35
Tysonite*	lb.	.24 -	.24¾
VA-7*	lb.	.50 -	.60
Vanfre*	gal.	2.50 -	3.00

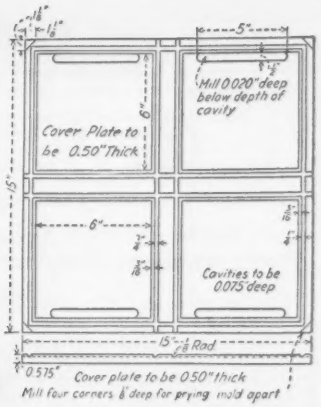
HOGGSON TOOLS, MOLDS, DIES

For Rubber Testing and Production



We supply molds and dies for making accurate rubber test strips and slabs; also molds for flex test, compression set test equipment, adhesion test; also molds for making plastic test samples. In addition, we offer a line of hand tools for working rubber and plastics. Write us your needs.

BENCH MARKER
1" and 2" Centers


5"
Mill 0.020" deep below depth of cavity
Cover Plate to be 0.50" Thick
6"
Cavities to be 0.075 deep
15"
0.515" Cover plate to be 0.50" thick
Mill four corners ⅛ deep for prying mold apart

HOGGSON & PETTIS MFG. CO.
141 A Brewery St., New Haven 7, Conn.
Pac. Coast: H. M. Royal, Inc., Los Angeles

Standard ASTM and Federal dies for cutting test tensile and tear strength samples, and dies for slab curing carried in stock. Write for catalog.

Mold Lubricants

Silicones • Non-Silicones

We blend the mold lubricant to the job. Tell us your molding problems. We have a wide variety of standard lubricants from which to choose the one for your job.

Write today for technical data and price lists.

Stoner's Ink Company

Quarryville, Pa.

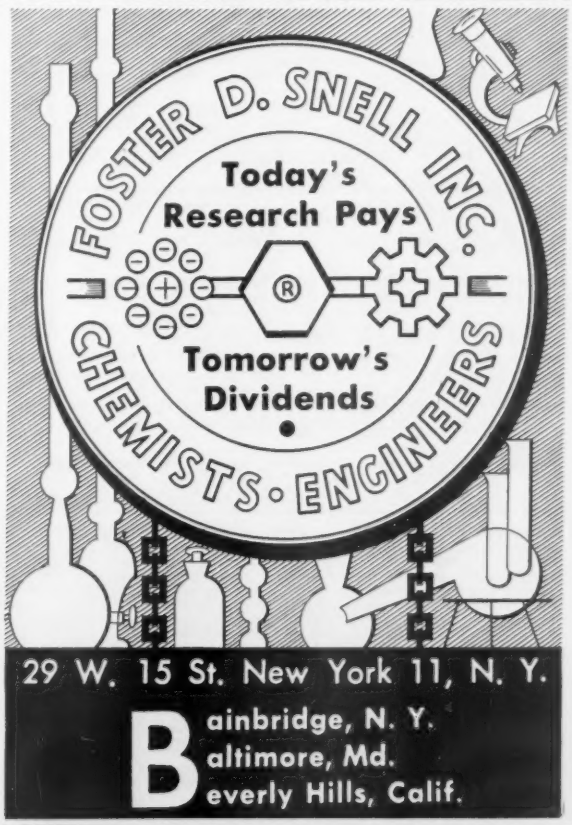
softeners and plasticizers
for rubber from the pine tree

ROSIN OIL • PINE TAR
BURGUNDY PITCH
GALEX a non-oxidizing ROSIN

Send for "Pine Tree Products" Brochure

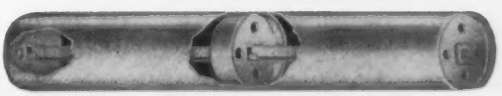
NATIONAL ROSIN OIL PRODUCTS, Inc.
Americas Bldg., Rockefeller Center, 1270 Ave. of the Americas, New York 20
Refinery - Savannah, Ga. • Branches in Principal Cities

PIONEERS OF THE INDUSTRY



29 W. 15 St. New York 11, N. Y.
Bainbridge, N. Y.
Baltimore, Md.
Beverly Hills, Calif.

STEEL CALENDER STOCK SHELLS



ALL STEEL, ALL WELDED CONSTRUCTION, with forged steel hubs for 1¼", 1½" and 2" square bars. 4", 5", 6", 8", 10", 12", 15", 20" and 24" diameters. Any length.

Also Special Trucks (Leaf Type) Racks, Tables and Jigs, Used in manufacturing rubber and plastic products.

THE W. F. GAMMETER COMPANY
CADIZ, OHIO

Hakuenka imparts to Natural and Synthetic Rubber High Tensile Strength, High Resistance to Tear and Abrasion, Low Modulus, Smooth, Fast Extrusion

HAKUENKA

Special attention to Export Trade
SHIRAISHI KOGYO KAISHA, LTD.
Kitahama, Osaka, Japan

CLASSIFIED WANT ADS

RATES:

All Classifications (except Positions Wanted):
12c per word in light face type—Minimum, $5.00
18c per word in bold face type—Minimum, $5.00

Positions Wanted: (Light face type only)
$1.00 for 25 words or less; extra words, 5c each.

When Box Number is used, add 5 words to word count

Heading on separate line, $1.20 in light face; $1.80 in bold face.

Advertisements in borders: $20.00 per column inch; maximum, 85 words per inch.

All Classified Advertising must be paid in advance except for advertisers on contract. Send check with copy.

Replies to keyed advertisements will be forwarded to advertiser without charge.

Address all replies to Box Numbers care of RUBBER AGE, 101 West 31st St., New York 1, N. Y.

Copy for July, 1956 issue must be received by Friday, June 29th.

POSITIONS WANTED

PLANT ENGINEER: Desires to relocate. 27 years in the rubber industry. Latex foam, mechanicals, and latex dipping. Qualified to handle maintenance and production; also your problems in air-conditioning, heating, ventilating and drying. Address Box 611-P, RUBBER AGE.

TECHNICAL DIRECTOR available. Capable as Production Manager. Cost conscious. Broad technical-practical experience with large and medium sized plants, producing chemical sponge, mechanicals and compression plastics for automotive, air-craft, etc., industries. Midwest location desired. Address Box 654-P, RUBBER AGE.

CHEMIST, M.S., experienced rubber roll manufacturing, development, production, customer contact work. Outstanding opportunity desired. West coast preferred. Minimum salary $10,000. Address Box 629-P, RUBBER AGE.

RUBBER TECHNICIAN, desires to relocate. 25 years experience in the wire and cable industry. Experience includes development and compounding, rubber and plastic extruding, laboratory control, factory control, technical supervision of production, and factory management. Address Box 630-P, RUBBER AGE.

PRODUCTION SUPERVISOR: Experienced in molding of foam products, pillows, mattresses and furniture stock. Complete working knowledge of Oakes machines, Walker-Shaw pumps and proportioneers. Complete knowledge of quality control and finishing room techniques and some knowledge of compounding. Address Box 645-P, RUBBER AGE.

SUPERINTENDENT OR MANAGER, 25 years experience manufacturing rubber heels, soles, slab soling, slab toplifting, close cell or open cell sponge and camelback. Can assume complete charge in any supervisory capacity. Address Box 652-P, RUBBER AGE.

HELP WANTED

RUBBER CHEMIST wanted for medium size plant in Ohio. Good academic background plus practical viewpoint from at least 10 years experience. Position requires versatility with latex dipping experience preferred and molded goods experience desirable. Very good future prospects in growing concern of excellent reputation with fine laboratory facilities. Our personnel know of this ad. Address Box 628-W, RUBBER AGE.

TECHNICAL SALES REPRESENTATIVE

Must have sales experience and good technical gackground in adhesives for rubber bonding. To travel in northeastern United States. Good opportunity with progressive, expanding company. Address Box 647-W, RUBBER AGE.

RUBBER PLANT SUPERVISOR

Man to supervise production in a new plant, located in medium sized town in southeastern section of country. Applicant must be able to assume responsibility for coordination of all production activities and assist in development of mechanical aids to production. This is a new plant, built in 1954, and offers unlimited opportunity to a young, aggressive person. Address Box 648-W, RUBBER AGE.

RUBBER CHEMIST

We need a man to be responsible for product control, practical research and some customer contact work. Some experience with plastics helpful. Major emphasis on formulating compounds to meet automotive specifications, oil seals, and hydraulic brake applications. Include detailed resumé and starting salary required. Address Box 650-W, RUBBER AGE.

CHEMIST—SEALING COMPOUND FORMULATOR

For automotive bodies, refrigerators, etc., polybutene and related types. Excellent opportunity in laboratory of small adhesive firm with good growth record. Located in Michigan. Salary commensurate with experience. Give details of experience and salary requirements. All replies confidential. Address Box 651-W, RUBBER AGE.

HELP WANTED—Continued

ANALYTICAL CHEMIST

Chemist with up to five years experience in analytical testing of latex foam, urethane foam and rubber and vinyl products. Position open in new plant to be located in Franklin, Sussex County, New Jersey. Write giving age, education, experience and salary requirements to Personnel Manager, HEWITT-ROBINS, INC., Box 84, Long Valley, New Jersey.

CHEMIST—PHYSICAL TESTING

Chemist with several years experience in physical testing of finished products of latex foam, urethane foam and rubber and vinyl products. Position open to be in new plant located in Franklin, Sussex County, New Jersey. Reply sending complete resumé of education, experience, age and salary requirements to Personnel Manager, HEWITT-ROBINS, INC., Box 84, Long Valley, New Jersey.

CHEMIST OR CHEMICAL ENGINEER

For development of adhesives. Experience in formulation of synthetic rubber-base adhesives imperative. Excellent opportunity in successful company. Replies held confidential. Contact H. C. Engel, BLOOMINGDALE RUBBER COMPANY, P. O. Box 59, Chester, Pennsylvania.

TECHNICAL SALES REPRESENTATIVE

Excellent opportunity for chemist or chemical engineer with 5 to 7 years experience in rubber compounding and processing having desire to enter sales field with Rubber Chemicals Division handling synthetic rubber and allied chemicals. Midwest location. Send resumé on education and experience with recent photo. All replies strictly confidential and our employees are aware of this ad. Address Box 655-W, RUBBER AGE.

CHEMIST — CHEMICAL ENGINEERS
"Positions with the better firms"
An active, confidential service!
Interview at your convenience!
"Many Junior Positions"
Call, write, or wire:—GLADYS HUNTING (Consultant)
DRAKE PERSONNEL, INC.
220 So. State St., Room 628, Chicago 2, Ill.
HArrison 7-8600

PERSONNEL SPECIALIST TO THE RUBBER INDUSTRY
Administrative,
Sales,
Technical and Production Supervision
Write or phone Leslie E. King, Manager Rubber and Technical Divs.
AKRON EMPLOYMENT SERVICE
Suite 607-08 Metropolitan Building, Akron, Ohio. POrtage 2-7641
Member: Chamber of Commerce, Ohio Private Employment Agencies Association and National Association of Personnel Consultants with 56 affiliate private agencies covering 26 states.

EXECUTIVE TECHNICAL SALES OFFICE
Nelson EMPLOYMENT SERVICE
specialist for the "Rubber Industry"
HAROLD NELSON — **653 FIRST NATIONAL TOWER**
PHONE: PORTAGE 2-8801 — **AKRON 8, OHIO**

"Help Wanted" continued on next page

ROTEX SCRAP
BUYING AND SELLING

RUBBER
Uncured Stocks
Scorched Compounds
Cured Overflow
Graded to specification

PLASTICS
Vinyl — Polyethylene
Bought — Graded — Sold
Cuttings, trimmings, Overflow,
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SERVICES
Mill — Compounding
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Grinding — Pelletizing
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ROTEX RUBBER COMPANY, INC., 1-23 JABEZ ST., NEWARK 5, N. J. • TEL. MARKET 4-4444

RUBBER CHEMISTS OR CHEMICAL ENGINEERS

A large firm engaged in the manufacture of elastomers needs a number of chemists and chemical engineers holding AB or MS degrees who are interested in technical sales service and development. Two to three years experience in the rubber industry is very desirable but not essential.

If you want this type of work, you will find this a real opportunity.

(Our employees know of this advertisement.)

Address Box 612-W, RUBBER AGE

WANTED

TOP LEVEL TIRE MANUFACTURING SUPERINTENDENT:

Large Midwest plant has excellent opportunity for man whose training and experience qualify him as Tire Manufacturing Superintendent. Applications confidential. State age, experience, other pertinent information. Suggest recent photograph.

Address Box 615-W, RUBBER AGE

RUBBER CHEMISTS

Degree in chemistry or chemical engineering. Up to five years' experience in rubber and polymer processing, development or production. Progressive company, well-equipped laboratory, permanent position with opportunity for advancement in expanding operation. Write giving age, experience and education. Replies held confidential.

Box 369
Erie, Pennsylvania

REMEMBER!

to show the box number on the envelope when writing to classified advertisers—that's the only way we can identify the advertiser to whom you are writing.

Address your letters to—

Box Number (show number)
c/o RUBBER AGE,
101 West 31st Street,
New York 1, N. Y.

TECHNICAL DIRECTOR

The rubber division of this multi-plant corporation, located in Ohio's vacation land on Lake Erie, has an opening in its top technical job, reporting to the Engineering Director in Cleveland.

This position requires a graduate chemical engineer or chemist from an accredited school. Age over 35. Advanced degree desirable.

He must have extensive experience in rubber formulating and plant processing, particularly for molding and extruding. He must be well-informed in the chemical and physical characteristics of elastomers of all kinds. The position also requires a knowledge of the design of rubber parts for both service and processing properties.

Administrative ability should be sufficient to control the activities of Product Development, Product Design, Product Engineering, Technical Service, Compounding, and Testing.

Salary commensurate with experience and responsibilities.

In reply give complete details of personal history, including snapshot. State present salary. All replies confidential.

Address: Dr. Peter V. Paulus
The Standard Products Co.
Port Clinton, Ohio

ADHESIVE CHEMIST

Medium sized company located in a Chicago suburb has an opening for a rubber chemist experienced in synthetic and natural solvent cements. This is an excellent opportunity to join a small expanding rubber development group in a growing diversified company.

UNUSUAL EMPLOYEE BENEFITS INCLUDING PROFIT SHARING, BONUS, INSURANCE AND LIBERAL VACATIONS.

Write giving age, experienced and education.

Laboratory Director
DAUBERT CHEMICAL COMPANY
4700 South Central Avenue
Chicago 38, Illinois

BUSINESS OPPORTUNITIES

CUSTOM MIXING, GRINDING and DISPERSION. Production time available on Rotary Cutters, Colloid Mills and explosion-proof Churns with attached filtering mediums. At your service—the technical know-how and completely equipped control laboratory. ADHESIVES & COATING SPECIALTIES, INC., Bldg. #22, 410 Frelinghuysen Ave., Newark 5, N. J.

ATTENTION Rubber and Plastics Industrial Products Fabricators. Are your products sold in industrial western New York? If not, write to Box 646-B, RUBBER AGE.

MIXING

To Your Specification

K. B. C. INDUSTRIES, INC. **NEW HAVEN, CONN.**

881 State St. Tel: State 7-5662

Otto J. Lang, General Manager

"Business Opportunities" continued on next page

Directory of CONSULTANTS

R. R. OLIN LABORATORIES, INC.
(Established 1927)
Consultation—Development—Research for rubber and plastics industries and for raw materials suppliers for same.
P. O. Box 372RA — Akron (9), Ohio Tel HEmlock 4-3724

SOUTH FLORIDA TEST SERVICE
(Established 1931)
Corrosion, weathering and sunlight tests. Four locations in Southern Florida for inland, salt atmospheric, tidewater and total immersion exposure tests.
4201 N. W. 7th St., Miami, Florida

PHILIP TUCKER GIDLEY
Consulting Technologist—Research, product development, formulas, factory plans, engineering, chemical and physical testing.
Fairhaven, Massachusetts

HALE AND KULLGREN, INC.
Specialists in Process and Plants for Rubber and Plastics
A Complete Engineering Service; including: Economic Surveys; Process Design; Installation; Contracting and Operation.
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Foam, Tire and Rubber Goods Plants and Equipment,
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For Fundamental Research, Production Control, and Advertising for Industry.
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ROSLYN HEIGHTS, N. Y.

BLACK
Master Batching
Mixing of all kinds
BESTREAD PRODUCTS CO. STOUGHTON, MASS.

NATIONAL SHERARDIZING & MACHINE CO.
AIR BAG BUFFING MACHINERY
STOCK SHELLS HOSE POLES
MANDRELS
858 Windsor St., Hartford, Conn.
Representatives: Akron New York

HOWE MACHINERY CO., INC.
30 Gregory Avenue, Passaic, N. J.
DESIGNERS & BUILDERS
OF "V" BELT MANUFACTURING EQUIPMENT
Cord Latexing, expanding mandrels, automatic cutting, skiving, flipping and roll drive wrapping machines.
ENGINEERING FACILITIES FOR SPECIAL EQUIPMENT
Call or Write

MASTER BATCHING
&
COMPOUNDING
to your specifications
WASHINGTON RUBBER CO.
P.O. BOX 241 WASHINGTON, PA.

BUSINESS OPPORTUNITIES—Continued

MANUFACTURER'S REPRESENTATIVE to sell standard and custom made molded rubber, along with standard and custom made vinyl and polyethylene extrusions. Must have established industrial accounts. Exclusive desirable territories open. Commission basis. Write and include lines currently handling and territory desired. Address Box 649-B, RUBBER AGE.

Have accumulation of vinyl sheeting compound, Banbury drippings
30 to 50,000 lbs. per month
Seeking outlet on a continuous basis.
Address Box 653-B, RUBBER AGE

FESTOON CAPACITY AVAILABLE
We have available large capacity for saturating, coating and drying of fabrics or papers coated with GR-S, natural rubber, and vinyl latices, oxidizable oils, etc. Temperature 160°F. maximum. Located within five miles of Boston.
THE H. M. SAWYER & SON CO.
Division of Sawyer-Tower, Inc.
Coated Fabrics Division
Watertown, Mass. Phone: WAtertown 4-0520

Custom
BANBURY OR MILL MIXING
and
CALENDERING OF RUBBER AND PLASTICS
LIGHT COLORED STOCKS A SPECIALTY
Phone: Milford, Mass., 1870
ARCHER RUBBER COMPANY
Milford, Mass.

Custom Mixing RUBBER-PLASTICS
We do milling and compounding of all types—black or color—master batches
All mixing done under careful supervision and laboratory control.
Phone: Butler 9-0400

Pequanoc Rubber Co.
MANUFACTURERS OF RECLAIMED RUBBER
MAIN SALES OFFICE and FACTORY: BUTLER, N. J.

Want to know where to go for a course in rubber chemistry and technology?

The *new* 1955-56 RUBBER RED BOOK

furnishes the answers to this (pp.981-89) and a thousand and one other questions.

EQUIPMENT FOR SALE

HYDRAULIC PRESSES

R. D. Wood 2500, 8-opening, 84″ x 54″ steam platens.
HPM 1200 ton, 15-opening laminating presses, 100″ x 120″ platens, self-contained.
Elmes 1,000 ton hobbing, M.D. pump.
HPM 750 ton, down-acting, 59″ x 44″ bed, self-contained.
Baldwin-Southwark 800 ton, 10-opening, 42″ x 42″ steam platens.
Morane 669 ton, 3 upmoving rams, 16″ stroke.
Farrel 625 ton, 52″ x 52″ platens, self-contained.
Watson-Stillman 600 ton hobbing, M.D. pump.
Farrel 393 ton, 2-opening, 48″ x 48″ steam platens.
Elmes 350 ton, down-acting, 30″ x 36″ bed, self-contained.
Lake Erie 300 ton, 30″ x 30″ platens, self-contained, semi-automatic.
Lake Erie 215 ton, 36″ x 36″ platens, self-contained, semi-automatic.
Carey 150 ton, 21″ x 16″ platen, adj. DLO 8″—28″ (3).
Lake Erie 100 ton, down-acting, 24″ x 24″ bed, high-speed, self-contained.
Farquhar 100 ton, down-acting, 30″ x 28″ bed, self-contained.
Farquhar 100 ton, drawing, down-acting, 29″ x 34″ bed, high-speed, self-contained.
HPM 100 ton, fastraverse, down-acting, 30″ x 30″ bed, self-contained.
Watson-Stillman 100 ton, down-acting, 22″ x 20″ bed, self-contained.
Watson-Stillman 100 ton, Burroughs 75 ton, HPM 35 to molding presses.
Farquhar 75 ton, up-acting, 30″ x 42″ platens.
Baldwin-Southwark 50 ton, angle molding press.
Watson-Stillman 50 ton, 12″ x 17″ elec. htd. platens.
Farrel 50 ton, 12″ x 12″.
Loomis 40 ton, 4-opening, 12″ x 12″ elec. platens.
Francis 40 ton, 4-opening, 12″ x 12″ elec. htd. platens.
Baker 30 ton fully automatic, 21″ x 26″.
Watson-Stillman and Elmes 30 ton and 20 ton lab. presses.
Stokes Model 200D-2, 15 ton automatic and Stokes 300, 200, 150 and 100 ton semi-automatic molding presses, all self-contained.
Dennison 2 ton model DH2C61 multipress, motor and controls (5).

INJECTION MACHINES

De Mattia, model B, 24 oz.
Reed-Prentice, 10-E-16, 16 oz. machine.
Fellows 8 oz., 1951 machine, practically new.
Impco, 8 oz., vertical model VF-8, late model.
Watson-Stillman 6 oz.
Watson-Stillman 4 oz.
Van Dorn 2½ oz., brand new in original crate.
HPM 2 oz.
NRK 2 oz. hand operated.
Van Dorn, model H-200, 1 oz. and 2 oz.
Watson-Stillman 2 oz.

TABLET MACHINES

Stokes S-5, 280-G, R-1, T-4, DD-2, DDS-2, RB-2, RD-4, RDS-3, R and T, Colton #5½, #5, #2-RP and #3-RP KUX 64.

EXTRUDERS

Royle Nos. 1, 3 and 4; Allen-William 8″—all individual motor drive.
3½″ electrical heated extruder.
Stokes-Windsor triple screw RC-200 practically new with conveyor and take-up.
Hartig converted 6″ oil heated.

MILLS

4—Farrel 18″ x 50″; 3—Farrel 16″ x 48″; Farrel 16″ x 40″. Available as mill lines or as individual units.

ROTARY CUTTERS

Cumberland No. 0, 2 HP M.D., Ball & Jewel 1 HP M.D., stainless steel.
Ball & Jewell 1 HP M.D., plain steel.
Ball & Jewell heavy duty ideal, 5 HP M.D.

CALENDERS

13″ x 48″ with M.D.
9″ x 48″ rolls belt drive.

MIXERS

Banbury No. 11, bodies only.
Banbury No. 9, 200 HP motor drive.
Banbury No. 3A, 150 HP, M.D.

ROLLER COATER

Union Roller Coater, model B-30-50, new 1952, up to 50″ material.

MISCELLANEOUS

Sturtevant Blenders: 1—#12 20,000 lbs. capacity, practically new; 2—#10 13,000 lbs. capacity, never used.
Stokes vacuum impregnating equipment.
Despatch 3 drawer and 8 drawer preheating ovens.
Megatherm 3 kw preheating ovens.
Vulcanizers, grinders, pumps, valves, platens, etc.

JOHNSON MACHINERY COMPANY
683-R Frelinghuysen Avenue — BIgelow 8-2500 — Newark 5, New Jersey
WHAT HAVE YOU FOR SALE? WHAT ARE YOU LOOKING FOR?

"Equipment for Sale" continued on next page

4—18 x 40″ Farrel heavy duty mills
1—16 x 42″ Farrel mill with motor and drive
3—400 ton hydraulic presses—14″ ram
2—170 ton hydraulic presses—12″ ram
1—8 x 18″ Pilot Production mill
New 6 x 12″ laboratory mills

Various size rubber mills and presses in stock.
We specialize in rebuilding rubber and plastics machinery.
All of our rebuilt machinery is guaranteed.
Buying and selling.

Reliable
RUBBER & PLASTIC MACHINERY CO., INC.
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PHONE: UNION 5-1073

Engineering Consultants

MACHINERY & EQUIPMENT

Designing Layout Evaluation

- **Rebuild**
- **Repair**
- **Erect**
- **Install**

A comprehensive engineering consulting service from machine design to complete plant layout. We also repair, rebuild and evaluate for rebuilding as well as provide expert legal evaluation of engineering problems.

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- **ATTRACTIVE**
- **NON-DETERIORATING**

RARE METAL PRODUCTS CO.
ATGLEN, PA.

LA GOMA

Monthly Technical Journal
The First Rubber Journal in Spain
Founded: January, 1929
Founder, owner, director and administrator:
Juan Blanch Guerrero
Calle de Moncada, 4, tienda, Barcelona, Spain
Annual Subscription:
Spain .....100 pesetas
Foreign .....125 pesetas

AKRON RUBBER MACHINERY CO., INC.

200 S. Forge St. — AKRON 9, OHIO — Phone HE 4-9141

"ARMACO"

We are one of the foremost specialists in supplying used, reconditioned, and new machinery for the Rubber and Plastic industries only. NEW—Laboratory mills, hydraulic presses, extruders, bale cutters, and vulcanizers. We are interested in purchasing your surplus machinery or complete plant.

"ARMACO"

EQUIPMENT FOR SALE—Continued

FOR SALE: Model 1 AU 11-527 Pangborn Sand Blast Unit. New, perfect for pipe lining.

THE POLSON RUBBER COMPANY
Garrettsville, Ohio

FOR SALE: 1 Farrel double platen press. Platens: 52″ wide x 96″ long, four 11″ diameter rams to operate 2000 psi. Complete with Triplex Pump and 7½ H.P. 220/440 volt, 3 phase motor. Press and pump factory reconditioned in 1954. Very good condition. CONVEYOR BELT SERVICE, 705½ Sixth Avenue, North, Virginia, Minnesota.

Electric and steam heated platens all sizes up to 42″ x 42″. New presses from laboratory up to 1000 tons. Pumping units up to 10,000 p.s.i., all capacities. CLIFTON HYDRAULIC PRESS CO., 290 Alwood Rd., Clifton, New Jersey.

FOR SALE: 4—Adamson 20 x 20″ hydraulic presses with 15″ ram; 1—National Erie 8½″ strainer; 1—65″ wide x 25′ long belt press; 1—18 x 54″ 3-roll calender; also mixers, vulcanizers, extruders, etc. CHEMICAL & PROCESS MACHINERY CORP., 52 Ninth Street, Brooklyn, N. Y., Phone: HYacinth 9-7200.

NEW ARRIVALS FOR SALE: French Oil Mill Machinery Compression Molding Presses; 75—170 tons, 3—170 tons, 35″ x 18″, 5—95 tons 29″ x 18″, 3—75 tons 18″ x 17″, 5 Preheaters 2 KW; Wood 20″ x 20″ 12″ ram, 170 tons; Southwark 24″ x 24″ 12″ ram, 170 tons; Baldwin Southwark 4—26″ x 26″ 8″ rams, 75 tons; 5—26″ x 26″ 7″ rams 57.7 tons; 2—15″ x 15″ 8″ rams, 75 tons; 2—19″ x 24″ 10″ rams, 78 tons; 2—12″ x 12″ 7½″ rams, 66 tons; 2—D&B 12″ x 12″ 7″ rams, 57.7 tons; 8″ x 9″ 4½″ rams, 24 tons; D&B 12″ x 12″ 3″ rams, 10 tons; HPM Transfer Molding 75 tons; Preform Presses, Colton 5½ T, Stokes R and DDS-2 MD; New Universal Dual Pumping Units 3-15 HP; Laboratory Mills and Calenders, also extruders, mixers, vulcanizers, injection molding units, etc. UNIVERSAL HYDRAULIC MACHINERY CO., INC., 285 Hudson Street, New York 13, N. Y.

FOR SALE: 1—Taylor Stiles giant rubber cutter; 1—Ball & Jewell rotary cutter, Model O, m.d.; 1—6″ x 12″ laboratory mill, m.d.; 1—new 3-roll 6″ x 16″ laboratory calender, m.d.; 2—Baker-Perkins size 15, 100-gallon jacketed mixers; 2—horizontal dry powder ribbon mixers, 500#, 1500#; 1—Fitzpatrick "D" comminutor, s.s. contact parts jacketed; 1—Mikro-Pulverizer #2TH, with motor; 2—Reed-Prentice 4 & 8 oz. injection molding machines; also other sizes Hydraulic Presses, Tubers, Banbury Mixers, Mills, Vulcanizers, Calenders, Pellet Presses, Cutters. WANTED: Your surplus rubber machinery. CONSOLIDATED PRODUCTS COMPANY, INC., 70 Bloomfield St., Hoboken, N. J. HOboken 3-4425; N. Y. Phone: BArclay 7-0600.

For Results—Use These Columns

WATERGROUND
MICA
WHITE and BIOTITE

A MORE UNIFORM MICA FROM OUR OWN DOMESTIC MINES

LOWEST PRICED . . . FROM OUR OWN LARGER SOURCE

The English Mica Co.
STERLING BUILDING · STAMFORD, CONN.

TESTED IS TRUSTED

PERMANENT SET TEST EQUIPMENT
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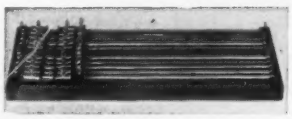

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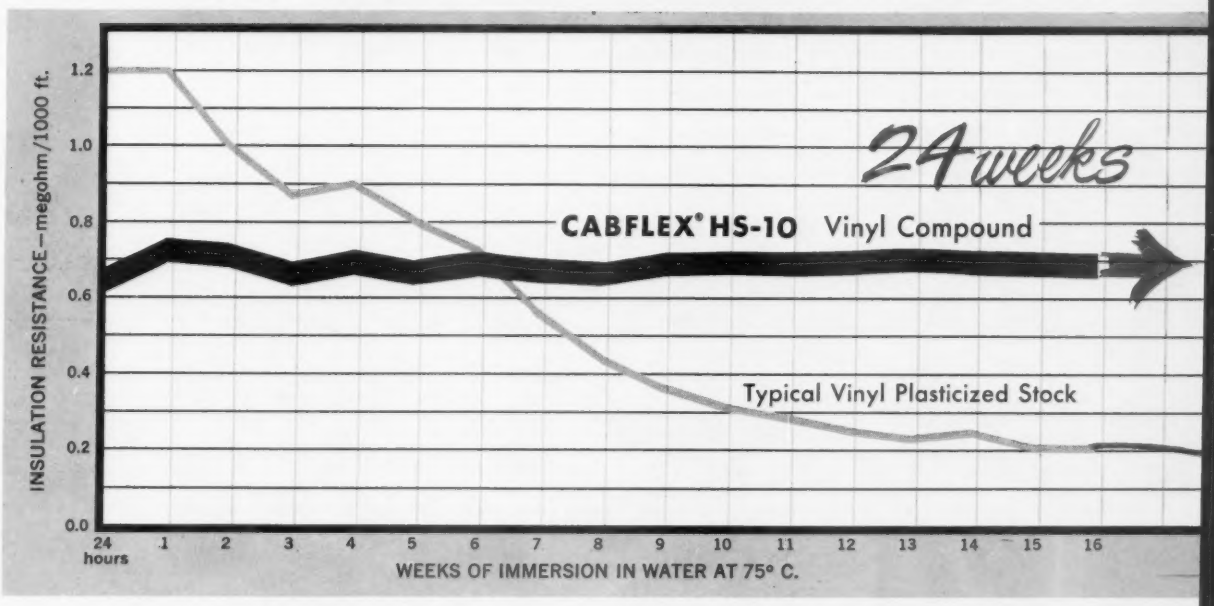

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